

*Gaining
Ground
against Cancer*

Gaining Ground against Cancer

An adjunct to *Fighting cancer:*
Anti-Cancer Council of Victoria 1936 to 1996



The views expressed by the author do not necessarily reflect the views of the publisher.



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Contents

- 3 Foreword**
Professor David Hill *AM* PhD, Director, The
Cancer Council Victoria
- 5 Part One: ‘First find your man’: the Cancer
Council’s approach to supporting cancer research**
Ann Westmore PhD
- 39 Part Two: ‘Pushing the limits’: the extraordinary
life and achievements of Don Metcalf**
Ann Westmore PhD
- 53 Afterword**
Nicole Prosper MA, Secretary to Council, The
Cancer Council Victoria
- 57 Appendix: Research Fellowships and Research
Grants-in-Aid funded by The Cancer Council
Victoria**
Introduction by Woody Macpherson, Head,
Research Management Unit, The Cancer Council
Victoria
- 123 Index of names**

Foreword

In 2001, the Cancer Council was proud to publish *Fighting Cancer: Anti-Cancer Council of Victoria 1936 to 1996*, written by the past president of the Cancer Council, Mr W Allan Dick AO.

The book introduced figures of significance in the history of the Cancer Council, its achievements over the years, and the obstacles it encountered on its way to becoming a central Australian influence in the field of cancer control.

We once again express our gratitude to Mr Dick, whose commitment and energy helped to drive the cause of cancer prevention in Victoria over many years until his death in 2003.

The present document is the work of Ann Westmore PhD, a medical writer and historian with a keen interest in cancer control and a long personal connection to the Cancer Council. She has examined the Cancer Council's approach to defining its research aims, and its recruitment of scientists who meet its research standards.

In Part One, Dr Westmore provides a history of the Cancer Council's strategic allocation of research funds, including its search for a scientist whose promise would warrant the awarding of the long-term Carden Fellowship. She also describes the establishment of our Cancer Control Research Institute, including its specialised units which support epidemiological and behavioural researchers, and Victoria's 'Cancer Parliament', the Victorian Cooperative Oncology Group.

In Part Two, Dr Westmore provides an insightful and lively account of the life and work of Professor Donald Metcalf, the Cancer Council's Carden Fellow, whose achievements underscore the importance of committing funds which enable long-term medical research.

The document concludes with a warm Afterword by our Secretary to Council, Nicole Prosper, recalling a celebration last year to commemorate Professor Metcalf's contribution to cancer control.

As our work continues and expands, and our excitement focuses on new research outcomes that hold promise for the future, it is valuable to reflect on how we have arrived at this point. This document adds to the growing volume of work that describes how cancer control has evolved and been shaped over the past 60 years, and the role the Cancer Council and its extraordinary people have played in its development.

David Hill AM PhD
Director
The Cancer Council Victoria

Part One

‘First find your man’: the Cancer Council’s approach to supporting cancer research

Like many new organisations, the fledgling Anti-Cancer Council believed its survival depended on managing its finances carefully and making a positive impression on the community it sought to serve. Its initial approach to supporting cancer research reflected these requirements.

The Executive Committee decided that half of the £60,000 raised (equivalent to over \$6 million today) in the fund-raising appeal held soon after the Cancer Council’s establishment in 1936 should be invested securely, leaving the other half for programs over the next five years.¹ Two members of the Executive then drafted a plan on the scope of the Cancer Council’s activities.

This working party comprised Professor Peter MacCallum, the Scots-born and New Zealand-trained head of the University of Melbourne’s Pathology Department, and Mr Rutherford Kaye Scott, a radiotherapist with surgical qualifications from the Royal Melbourne Hospital. They recommended that only a small part of the Cancer Council’s funds should be expended on research. Moreover, rather than investing time and effort in the speculative and necessarily drawn-out search for new facts and principles, research funding should be allocated to studies likely to improve existing treatments, especially surgery and radiotherapy.

Although prudent in financial terms, these ideas on research spending resulted in differences of opinion among members of the Executive Committee. In August 1937, it fell to Sir Hugh Devine, Chairman of the Executive and an eminent Melbourne colorectal surgeon, to defend a public statement that the funds of the Cancer Council would not be devoted primarily to research. He told the Medical and Scientific Committee, whose job was to advise the Executive on all matters of scientific policy, that:

‘While it (the Executive Committee) realises that one of the objects of the Anti-Cancer Council is to foster research into the cause of cancer, it feels that ... it should be temperate in this regard, and spend only a small proportion of the funds in this way.’²

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- 1 ‘Cancer Council’ refers to the Anti-Cancer Council of Victoria or its successor body, The Cancer Council Victoria
 - 2 Minutes of the fourth meeting of the Medical and Scientific Committee of the Anti-Cancer Council of Victoria, 1 October 1937, p. 2

Furthermore, Sir Hugh said the research subsidised by the Cancer Council should offer the prospect of an immediate improvement in the efficiency of cancer treatment, wording that indicated the Executive would not look favourably on research into the mechanisms underlying cancer, since this could not be expected to rapidly translate into better or more efficient cancer treatment.

He also stated that funds would not be made available for the sporadic research efforts of part-time workers (hospital clinicians or hospital pathologists, for example), a decision that could be seen as a veiled criticism of the output of such workers and the relevance of the research they undertook. However, he couched the argument in cost/benefit terms in that ‘Such research was unlikely to yield results commensurate with the expense involved’. The Executive was adamant that whatever research was funded should be undertaken in standard research institutions (including university departments, The Walter and Eliza Hall Institute of Medical Research and the Baker Medical Research Institute) and carried out under the guidance of an experienced Director of Research.

Sir Hugh concluded that the major part of the Cancer Council’s available funds should go:

‘to the immediate betterment of cancer sufferers, and especially for the poor people, the present known effective methods of surgical and radiological treatment, methods which we do know, if properly and widely applied, would cure or give relief to a greater number of persons affected with cancer; the money should initially be expended on educating the public in the early detection of cancer, in providing free treatment for poor people, in arranging for more efficient treatment and for Hospital and Hospice accommodation for late cases of cancer.’

In so saying, he indicated the Executive’s view that a vast array of unmet needs existed in the Victorian community with respect to cancer, and that research was some way down the priority list.

A difference of opinion

The Cancer Council’s archives show that senior members of the Medical and Scientific Committee did not necessarily agree with the Executive-sanctioned research plan. Among its more outspoken opponents were Dr Tom Cherry, a very experienced bacteriologist and administrator and the University of Melbourne’s Cancer Research Fellow from 1925 to 1934, and Dr William Penfold, a distinguished scientist and administrator, who had been appointed Foundation Director of the Baker Institute in 1927 after heading the Commonwealth Serum Laboratories for a decade from its establishment in 1916.

Responding to questions about the rationale for the plan, Sir Hugh stated that large sums of money were already available or were expected to become available for research on cancer in centres such as the Baker Institute and the Walter and Eliza Hall Institute. Moreover, at the University of Melbourne, both the Pathology Department and the Melbourne Cancer Causation Research Committee were active in this area.³ In any case, a considerable amount of cancer research was underway in other countries, some of it funded far more generously than the Cancer Council could ever hope to achieve.

Sir Hugh also insisted that subscribers to the recent Cancer Council campaign had expressed the universal desire ‘that money should not be dissipated in scientific research into the causes of cancer with little immediate benefit for the cancer patient.’⁴ This claim aroused a prompt and hostile response from Dr Cherry, who expressed ‘disbelief’ that donors had stated any such unwillingness for their money to be spent on research. He argued that the Medical and Scientific Committee alone had the power to decide whether research should or should not go ahead. Dr Penfold in turn suggested that the matter was in dispute and the Executive should produce minutes of its discussions. He then proceeded to argue the case for funding a research project on brain tumours.

High expectations for combined surgery and x-ray treatment

Research that sought to improve the outcome of surgery and radiotherapy was of great interest to Sir Hugh and Dr Kaye Scott. Sir Hugh had been instrumental in the formation of the Royal Australasian College of Surgeons, and became its President in 1939 after a period as Vice-President. For his part, Dr Kaye Scott was active in the formation of the Australian and New Zealand Association of Radiologists in 1935 and its subsequent development into a Royal College. (He was later to become Foundation Medical Director of the Cancer Institute.) Any research that improved the outcome of surgery and radiotherapy would benefit patients and could be expected to enhance the claim of the relevant professional groups to expertise in the cancer area.

There was a growing consensus within the interwar Australian medical community that the combination of surgery to reduce the size of cancerous growths, followed by the positioning of radioactive substances—x-rays, radium needles and the like—into areas where the scalpel alone would prove too damaging, represented a

3 The Melbourne Cancer Causation Committee consisted of 15 medical practitioners from various specialties, two scientists and a business man. See Tom Lowe, *The Origins of the Cancer Institute*, p. 3

4 *op cit*, Minutes of the fourth meeting of the Medical and Scientific Committee of the Cancer Council

most promising advance in cancer care. Already, a Victorian Government advisory committee on cancer had noted that surgeons were becoming ‘very interested in radium treatment’ and it was expected that this interest would lead ‘to an improvement in the surgery of access to growths, and that the methods of inserting radium into tumours will in the course of time be perfected.’⁵ By the late 1930s, doctors were using the combination of surgery and x-ray therapy to treat many cancers of the breast, skin, tongue, uterus and prostate in Victoria, and the results seemed to be improving by the year. It was a message full of hope and the Cancer Council considered it to be a valuable direction.

Australia held a plentiful supply of radium, courtesy of a 1928 decision by the Commonwealth Government to import 10 grammes of the substance. In 1938, with the aim of facilitating medical access to reliable radiotherapy supplies, the Executive Committee approved a substantial grant of £6500 (over \$300,000 today) to the University of Melbourne to help fund an x-ray and radium laboratory under Commonwealth control. This funding helped regulate x-ray equipment, ensuring patients did not receive excessive dosages of radiation.

The following year, Professor MacCallum and Dr Kaye Scott, again working together at the behest of the Executive Committee, produced a report on controlling access to radium and radon and the Executive approved grants for modern radiotherapy equipment to a number of large teaching hospitals. A little more than a decade later, Dr Kaye Scott was among the recipients of Cancer Council research funds to study the effect of various combinations of x-rays and chemicals on tumour growth.

The impasse over the allocation of research funding was sidelined temporarily with the advent of World War II. It had, however, brought to the fore several unresolved issues: a blurring of responsibility between the Executive and the Medical and Scientific Committees on some research matters and a lack of clear guidelines for allocating research funds in instances where committee members’ own departments and colleagues stood to benefit.

Making use of information from patient records

The MacCallum–Kaye Scott plan sanctioned by the Executive Committee but questioned by the Medical and Scientific Committee included a proposition that met with universal approval. That was the matter of setting up a system to monitor the cancer treatment experience of patients attending Melbourne’s large public

5 Report of the Advisory Committee on Cancer, Victoria, 1929, p. 6

hospitals.⁶ By 1938, a number of hospitals had agreed to cooperate in such a project and the Cancer Council established a sub-committee to examine it.

Sub-committee member, Dr Robert Fowler, a leading cancer surgeon with the reputation of being Melbourne's 'uncrowned king of gynaecology',⁷ prepared a report recommending the formation of a Central Cancer Registry. The following year, the Executive Committee adopted the proposal and Dr Fowler was appointed Honorary Chief Registrar. His interest in transforming patient history cards into the stuff of medical insights had been evident in 1937, when he told the Medical and Scientific Committee he intended addressing the Ninth Australian Cancer Conference in Sydney on two topics: 'The research value of clinical records in following up gynaecological cancer patients' and 'A statistical survey of the results of treating uterine cancer'.

In January 1940, the Registry officially started operating, financed entirely by the Cancer Council and jointly sponsored by the Victorian Health Department and collaborating hospitals (the Alfred, Austin, Prince Henry's, Royal Melbourne, Royal Women's and St Vincent's). Its hub was an office provided by the Royal Australasian College of Surgeons in Spring St Melbourne, later moving to the Cancer Council's offices in Albert St, East Melbourne. Collaborating hospitals chose cancer registrars from among their resident medical officers to summarise relevant aspects of the medical records of all public patients with cancer. When another four hospitals (the Queen Victoria, Peter MacCallum Cancer Institute, Royal Children's and Royal Victorian Eye and Ear) later joined the registration scheme, the Registry could claim to 'play an increasingly important role in the campaign against cancer in Victoria.'⁸

Dr Fowler, in consultation with Mr G E Kitson, a Victorian Government statistician, made many crucial decisions at an early stage about what information should be collected, how its confidentiality should be preserved, and how it should be classified and analysed. Measuring the incidence of cancer was not possible, but the Registry provided an excellent way to monitor the effectiveness of cancer treatments, particularly in relation to the stage of cancer at which treatment started.

Following Dr Fowler's retirement in 1955, two permanent medical officers, Dr Frank Kerr of the Cancer Council and Dr Douglas Rankin of the Victorian Health Department, assumed responsibility for abstracting the necessary medical information, while the Cancer Council's Medical Adviser, Dr E V ('Bill') Keogh, handled the overall supervision of the Registry and all requests for information. Although

6 D W Rankin, 'The Central Cancer Registry, Melbourne, 1940-1970, *The Medical Journal of Australia*, 3 April 1971, pp. 750-754

7 Colin Smith, 'Dr Robert Fowler' entry in *Australian Dictionary of Biography*, 1940-1980, pp. 209-10

8 'The Central Cancer Registry', *Victorian Cancer News*, 14, Oct-Dec 1962, p. 1

information on cancer incidence in Victoria was not available from the Registry, Dr Keogh appreciated very well the importance of such data to an understanding of cancer. Contemporaries well remember him poring over the reports of the pioneering Danish Cancer Society's Registry developed by Dr Johannes Clemmesen and his formulation of seemingly endless hand-written tables from the Danish data, in search of patterns of cancer and hypotheses about its causation.

Apart from a wartime break of four years, the Registry's operations continued uninterrupted. By 1961, it had accumulated the abstracted case histories of over 40,000 patients, rising to nearly 90,000 by 1970 and over 120,000 by 1975.

Dr Fowler drew on Registry data in 1955 to support claims for a positive association between lung cancer and tobacco smoking. In so doing he provided the first Australian statistical evidence to support an association first postulated in the 1930s and 1940s by European researchers.⁹ This work received full support from Dr Keogh who, although addicted to tobacco himself, accepted the findings and their implications for public health. Because of his understanding of the dose-response relationship (that is, the greater the exposure of the body to cigarette smoke, the greater the risk of organ damage), he was very interested in the tar and nicotine content of cigarettes and the use of filters to reduce the exposure of the lungs to cancer-causing agents. In 1967, Dr Keogh arranged for a sample of 10 Australian brands of cigarette to be sent for testing to Dr Fred Bock, Director of the Roswell Park Laboratories in New York State. By the time Dr Nigel Gray became Director of the Cancer Council the following year, a 'smoking machine' which produced tar when it smoked a cigarette was in use for demonstration purposes.

In 1958, the Registry's chief statistician, Miss Cynthia McCall, together with Dr Rankin and Dr Keogh, reported on deaths from leukaemia in Victoria between 1946 and 1955. Subsequently, Miss McCall helped analyse the results of lung cancer treatment in Melbourne between 1946 and 1960. She also assisted the Victorian Health Department in a major survey that found about 100,000 people in Victoria had experienced skin cancer, with men twice as likely to be affected as women, and that 40,000 cases remained untreated. The Cancer Council helped Miss McCall develop her expertise by funding a visit to US and UK cancer statistics units in 1952. Dr Rankin also received funding from the Cancer Council to study cancer statistics at the University of London in 1956-57.

Other research spin-offs from the Registry included four statistical reviews edited by Dr Fowler in his retirement dealing with particular aspects of cancer in Victoria.

9 Richard Doll, Address at the University of Melbourne, 19 November 1998

Following Dr Fowler's death in 1965, Dr Keogh remarked to Dr Robert Fowler Jr that the Registry had propelled statistical investigation of cancer and its treatment to a new level. 'Few people appreciate that your father was a pioneer in Australia in proper medical statistical work; he was 20 years ahead of his time.'

Computerisation of the Registry started in 1971 and four years later discussions were held about the changes necessary to enable it to measure cancer incidence in the Melbourne metropolitan area. During the 1980s, the original follow-up of patients to assess their progress under treatment was phased out, while in 1981 Victorian health authorities made cancer a notifiable disease. The following year, the state's cancer incidence was measured for the first time. It then became possible to embark confidently on major studies of an epidemiological nature—in other words, studies dealing with the occurrence and distribution of cancer throughout Victoria. The far-sighted work of the Registry set the stage for later developments and ensured Victoria was well placed to embark on major new initiatives. (See later, **Two in-house research centres.**)

The Carden Bequest: 'First find your man'

The 1936 Act establishing the Cancer Council listed the organisation's first two objectives as the coordination of all cancer research activities and the promotion and subsidisation of cancer research. As we have seen, a dispute over how best to fulfil these aims occurred in the late 1930s, leading to an impasse which may help explain why none of three applications to the Cancer Council for research funding in 1939 gained approval.

The receipt of a generous bequest for cancer research from Melbourne cinema owner, Mr George Carden, was partly responsible for forcing a decision on the issue of whether researchers funded by the Cancer Council should seek to unearth the fundamental causes of cancer or should merely play their part in clearing up uncertainties and closing gaps in existing methods of cancer treatment. The bequest stemmed from a casual conversation in 1942 between Mr Carden, owner of the Adelphi Picture Theatre in North Carlton and Mr Charles Herschell, a film-maker and member of the Cancer Council's Publicity Committee.¹⁰

The discussion between Messers Carden and Herschell followed a regular luncheon meeting involving a group of prominent Melbourne citizens interested in welfare work. As the two men left the luncheon, Mr Carden mentioned his interest in doing something that would help in the search for a cancer cure, his wife having died from the disease. Mr Herschell organised a meeting with key figures from the Cancer

10 For more information on Charles Richard Herschell see Rosemary Simpson, *Do It Now – The Life of Charles Richard Herschell*, self-published, 1995

Council's Fund-raising Committee, namely Dr Bernard ('Zeddy') Zwar, President of the Royal Melbourne Hospital, and Sir Russell Grimwade, an industrialist and businessman.

Mr Carden later met two leading English cancer specialists who were coincidentally visiting Australia. The specialists, Drs Edith and Ralston Paterson, impressed him with their outlook and enthusiasm, and when Mr Carden died in 1945 he left the Cancer Council the handsome sum of £70,000 (in today's terms, well over a million dollars).

The terms of the bequest, which materialised two years later, stated that the interest on the capital was to give rise to a fund to be known as the 'Carden Cancer Research Fund'. Income derived from the fund was to be used solely to support a cancer research worker. The bequest also specified that the researcher would have the discretion and liberty to select the location of his or her work, the scientific field of operations and the persons with whom he or she would associate while doing research, subject to the Cancer Council's approval. Reflecting the optimism of the time that science would reveal the fundamental nature of disease, a bonus was payable should the researcher 'discover the cause and cure of cancer'. In accepting the terms of the bequest, the Cancer Council in effect resolved to support research on the basic nature of cancer, rather than settling for the conduct of derivative research. It was a decision that had far-reaching consequences.

The Cancer Council made a first attempt to find a suitable researcher in 1948 after consultation with the Director of the Walter and Eliza Hall Institute, Professor Frank Macfarlane Burnet. As a result, it approached Dr Rupert Willis, a highly regarded Australian pathologist then working in England, about the job.

Dr Willis had been a member of the Executive Committee from 1936 to 1945 while working as the Alfred Hospital's pathologist and the University of Melbourne's lecturer in tumour pathology. He expressed an interest in the position of Carden Fellow, but stressed three major requirements: university status, independence, and an annual expenditure of up to £11,000 pounds (more than \$200,000 today). This was well above the amount the bequest was earning at the time and well in excess of the amount the Cancer Council was considering allocating to the Carden Fellow.

Dr Willis' candidature raised a major issue about the evolving organisation of cancer research in Victoria. There were those like Professor MacCallum (by then Chairman of the Executive Committee) who favoured accommodating Dr Willis within the proposed Cancer Institute, on whose Board he (Professor MacCallum) also served. The Institute (which subsequently changed its name to the Peter MacCallum Cancer Institute) was envisaged as the central cancer treatment centre for Victoria and a site of cancer research. However, the Cancer Institute was not

sufficiently advanced to approach Dr Willis with a definite proposition and he accepted the position of Professor of Pathology at the Royal College of Surgeons in London, and subsequently Professor of Pathology at Leeds University, where he made notable contributions to paediatric oncology and numerous other fields.¹¹ In any case, additional research funds were needed if the type of work he envisaged was to occur in Melbourne.

Disappointment that Dr Willis had been lost to Australia, led the Cancer Council, the Cancer Institute and the University of Melbourne to form a joint Committee to guide the Carden appointment. But tensions emerged as to who should control the process and where the successful applicant should work. The Cancer Council resolved the issue by establishing negotiations solely with the University and by seeking academic status for the appointee. It was decided that the successful candidate should work either at the University or at a medical institution approved by it, should be a graduate in medicine, science or veterinary science with an aptitude for research, and should agree to a salary in the range £1500 to £2000 plus the University's cost of living adjustment (then amounting to several hundred pounds a year).

By 1952 the Carden trust fund had an accumulated income of £10,000 and the Cancer Council had gathered nearly as much again for research purposes from other bequests. But it had, as yet, no Carden Research Fellow.

Dr Keogh, who had joined the Cancer Council's Medical and Scientific Committee in July 1950 as the nominee of the Victorian Health Department, and who was appointed to its Executive Committee the following month, stressed in 1952 the need to 'First, find your man'. This sentiment was applauded by other members of the newly established Carden Trust Standing Committee, who noted that the full significance of the comment lay in the fact that research projects could not be manufactured from bricks and mortar, optical instruments, laboratory animals or even Acts of Parliament. Good research was the fruit of the human intellect.¹²

Dr Keogh's influence on helping develop the Cancer Council's research policy and practices cannot be overstated. A person of great influence in medical science in Australia, he rose to prominence as head of the Commonwealth Serum Laboratories' virus research laboratory in the 1930s and during the war assumed the crucial role of the Australian Military Forces' Director of Hygiene, Pathology and Entomology. He was credited subsequently with having the foresight to insist on the wartime manufacture of penicillin in Australia and with nominating Dr Val Bazeley to

11 John Colebatch, 'Pioneers in Pediatric Oncology', *The American Journal of Paediatric Haematology/Oncology*, 7, 175–182, 1985

12 Memorandum in support of Dr Fowler's motion, 26 March 1952

lead the Commonwealth Serum Laboratory's outstandingly successful penicillin production team. In the post-war period, he was Victoria's Director of Tuberculosis and a member of the State Consultative Committee on Poliomyelitis. With this background, he became Medical Advisor and Secretary to the Cancer Council in 1955 (a position he held until 1968). He had the connections and the clout to see that the Cancer Council's support for cancer research reached new heights. His abiding interest in research as a basis for sound public health policy and practice was apparent at the Cancer Council, where he analysed data and generated hypotheses, resulting in publications in the *Australian Journal of Experimental Biology and Medical Science* and in the international science journal, *Nature*.

The second attempt to find a suitable Carden Fellow followed an international advertising effort, which led the Carden Trust Standing Committee (comprising representatives from the Cancer Council and the University) to consider six candidates in 1953: five men and a woman. To help in selection, the Committee sought impressions of the candidates from eminent scientists including Professor MacCallum, Professor Burnet, Professor Roy ('Pansy') Wright, Sir Howard Florey, Professor Hugh Ward, Professor Edgar King and Professor J W Cook from Glasgow.

Surviving letters from one young scientist who considered applying for the Carden Fellowship shed light on the sorts of issues Australia faced in trying to build a credible cancer research effort in the late 1940s. Dr Henry Harris, a University of Sydney medical graduate working at the Dunn School of Pathology, Oxford University, enquired of Professor Wright, then head of Melbourne University's Physiology Department and a member of the Cancer Council's Medical and Scientific Committee since 1940, whether the Cancer Council fully understood the need to provide the Carden recipient with support such as laboratory accommodation, equipment, and bacteriological, chemical, photographic and animal house services.

*'The real doubt in my mind, and the one stressed by [Sir Howard] Florey, is the question of funds and accommodation. Although on paper, the provisions for accommodation seem generous enough, in fact they don't amount to much. With the possible exception of the Hall Institute, no place in Melbourne is set up to do the sort of work involved in 'fundamental cell physiology' and it must be admitted that this kind of work is pretty expensive. I do not know how charitable Burnet would be to an interloper not primarily concerned with microbiology in the accepted sense. And even in the Hall Institute, a very considerable outlay of funds would be required before a reasonable laboratory could be established.'*¹³

13 RD Wright papers 1/10/6

Professor Wright replied in his typically colourful manner that the Carden Fellowship offer was ‘the best we could get out of a bunch of drongoes and does allow a satisfactory person to start in on the work.’

Dr Harris also asked Professor Wright about the option of taking the Carden Fellowship at the Cancer Institute (where Professor Wright was at the time Chairman of the Executive Committee). He wondered about the state of its research facilities and laboratory space, and about who would head the department to which a Carden Fellow would report.

Reading between the lines, Professor Wright’s response indicated that a Carden Fellow based at the Cancer Institute would virtually be starting from scratch.

I can see no reason why there should not be a very good centre in the study of cells in Melbourne; it is, after all, a sizeable city and at the moment it does not spend more than 150,000 pounds per annum on medical research.

I appreciate that at your stage you may wish to remain in a well developed laboratory to make science. However, you might perhaps find out what the Dunn laboratory was like in 1937 when Florey was scratching for the odd thirty pounds to buy a respiration pump . . . The laboratory is probably one of the few well equipped ones now, and it is because I want to see such well equipped laboratories in Melbourne that I take the interest I do in what might be called the jungle warfare of this city.’

Perhaps not surprisingly, Dr Harris decided not to apply for the position. After six months, the Carden Trust Standing Committee decided that no applicant was sufficiently outstanding to merit appointment. However it agreed that Dr Donald Metcalf, a young Sydney medical graduate who was interested in cancer research, deserved encouragement.¹⁴ He had worked for a year at the University of Sydney, completing a Bachelor of Medical Science degree with Professor Patrick de Burgh, Professor of Microbiology. Importantly, Professor de Burgh held Dr Metcalf in high regard.

In 1953, the Standing Committee offered Dr Metcalf a guaranteed salary for two years as the first Carden Research Worker, with the possibility of an extension to Carden Research Fellow. During the consultation process, Professor Ward, from the Australian Red Cross Society’s Sydney office, said of Dr Metcalf that while he obviously lacked sufficient experience to be considered for the Fellowship he (Professor Ward) was confident that Dr Metcalf had a future in research ‘if he is fortunate enough to get the necessary training’. Dr Metcalf, who had indicated when

14 Letter dated 24 July 1953 from the Secretary of the Anti-Cancer Council to The Manager, Perpetual Executors and Trustees Association of Australia, trustees of the Carden Bequest

applying that he was willing to work as a Junior Fellow while being trained, accepted the conditions specified in the offer, which included working under Professor Burnet, the Director of the Walter and Eliza Hall Institute.

Dr Metcalf commenced work at the Institute at the beginning of 1954 and found the facilities under-developed, as anticipated by Mr Harris. He gained the impression that Professor Burnet considered he was wasting his time doing cancer research, believing cancer cells arose from inevitable natural mutations and that their spread was essentially untreatable.

*'In his view, anyone undertaking cancer research was at best misguided and to pursue cancer research in his Institute certainly required a rather circumspect approach under a somewhat disapproving eye.'*¹⁵

Consequently Dr Metcalf spent much of the following decade working in the 'laboratory suite' on the second floor of the Hall Institute's animal house. He shared the floor with three animal rooms, an insectary, an (animal) post mortem room, two offices and two laboratories, far from ideal conditions for someone whose nose and eyes streamed in close contact with mice!

Notwithstanding the less-than-salubrious working conditions, Dr Keogh reported that Dr Metcalf was making 'most satisfactory progress' two years after starting, and that Professor Burnet was 'impressed with the developments in his research'. Dr Keogh continued perceptively:

'Dr Metcalf has recently identified, in the blood of patients suffering from some types of leukaemia, a substance which stimulates lymphocyte production in mice. Work in progress suggests that this factor is produced by the thymus gland. This is a new approach in the study of leukaemia, and one which opens up a highly promising field for research.'

Dr Metcalf was required to report annually to the Executive Committee, rather than to members of the Medical and Scientific Committee who oversaw most other research. It did not take long for members of the Executive to appreciate Dr Metcalf's potential, and in 1956 they gave approval for him to undertake further study in America.

He spent nearly a year at the Boston Children's Hospital Cancer Research Unit under the supervision of Dr Jacob Furth, a world authority on leukaemia. This led to an appointment as Research Associate in Pathology at the Harvard Medical School, which Dr Keogh described as 'an unusual honour, and shows he is earning a place for himself in research work in the US'. Dr Metcalf later described Dr Furth as his

15 Don Metcalf, 'The Colony Stimulating Factors – Discovery to Clinical Use', The Burnet Lecture, 1993

most influential teacher, 'his unquenchable enthusiasm and remarkable perception opening up new vistas for me in tumour biology'.¹⁶ A further couple of months spent in the UK with Cancer Council support allowed him to observe cancer research there as well.

On returning to Australia, the Carden Leukaemia Research Laboratory started operation with Dr Metcalf assisted by a laboratory technician, a pathology technician and two animal house staff. His stint overseas convinced him that the international cancer research scene was in the grip of an 'almost irrational enthusiasm' for tumour viruses as the primary cause of most cancers. The fashion for viral research in cancer was tempered only by a recognition that subtle factors regulating the growth and differentiation of cells, and the response of cells to such regulators, demanded increased attention if researchers were ever to understand the disturbances in cancer cell function.¹⁷

In the following years, Dr Metcalf worked at the leading edge of international cancer research, some highlights of which include:

- the development with Dr Ray Bradley of a simple reproducible method for growing large colonies of bone marrow cell populations, thus allowing previously non-feasible experiments to be conducted on the cellular basis of blood cell formation. (The Cancer Council also supported Dr Bradley's work.)
- new insights into the function of the thymus gland. In 1956, Professor Metcalf showed that human and mouse thymus contained a hormone capable of stimulating the appearance in the blood of lymphocytes (a type of white blood cell crucial to immunity). He later showed that when a thymus graft establishes itself in a compatible host, its own cells are replaced by those of the host within a matter of weeks. These findings helped stimulate the whole of immunology and clinical medicine¹⁸.
- the discovery with Walter and Eliza Hall Institute colleagues of a family of blood growth factors they dubbed the 'colony stimulating factors' (CSFs). These control the maturation of white blood cells from undifferentiated precursor cells known as stem cells. Professor Metcalf and his team proved the accuracy of the underpinning notion that leukaemia was a series of diseases in which affected blood-forming cells were abnormally regulated.

16 *The Lancet*, 349, 8 March 1997

17 Don Metcalf, 'Personal Report to the ACCV', June 1960–1961

18 'Britannica Australia Award, 1966, for Medicine, *The Medical Journal of Australia*, 24 Dec 1966, p. 1254

They reasoned that if these regulators could be identified, it might be possible to show that their abnormal production or the body's abnormal responsiveness to them was crucial to the onset of leukaemia. The CSF purification process occupied 15 years and a succession of protein chemists. Perhaps fortunately, none of the scientists involved realised that the existing technology and the lack of a tissue source rich in CSF meant that progress was bound to be painfully slow. But by the end of 1983, the team had identified and purified four CSFs capable of controlling the production of white blood cells known as granulocytes and monocyte-macrophages.

Clinical applications appeared remote until molecular biologists from centres including the newly created Ludwig Institute in Melbourne solved the barrier that was preventing the mass production of the CSFs. In an international race that ended in bitter legal wrangles over patent rights for the multi-million dollar annual sales of the CSFs, they sought to clone the CSF genes.

During the past decade, the CSFs have been used to treat millions of patients worldwide, reducing rates of infection and the need to stay in hospital after high-dose chemotherapy, bone marrow transplant and other health difficulties leading to depressed white blood cell counts.

Internationally renowned tenor, José Carreras, was one famous patient whose life was saved by a member of the CSF family known as GM-CSF. The singer visited the Carden Cancer Research Laboratory in 1991, much to the delight of Professor Metcalf, an opera fan of long-standing. Mr Carreras had developed acute myeloid leukaemia in 1987 and treatment with a bone marrow transplant in the US failed to arrest the disease. With death staring him in the face, he accepted the offer of CSF treatment, becoming one of the first patients to receive it anywhere in the world. He responded positively to the treatment within 24 hours and recovered uneventfully. Fittingly, this great entertainer regained good health as a result of research made possible by the generosity of Mr Carden, who was himself active in the entertainment industry.

(The entertainment/opera theme came full circle at the 50th anniversary celebrations mentioned below and in the Afterword. During the event, George Carden's niece, Ms Joan Carden, a renowned Australian opera singer, gave a rousing performance.)

Fifty years after becoming a recipient of the Carden Bequest, Emeritus Professor Metcalf (a University of Melbourne appointment) has played a central role in unravelling the ways in which blood growth factors orchestrate the composition of the blood and the ability of its component cells to fight infection. By 2005, his insights into factors that balance and unbalance the control of blood-forming

cells had helped revolutionise the treatment and care of an estimated 5.5 million patients whose immune systems were compromised for one reason or another. He was the uncommon medical researcher who was still working while the results of his experimental studies were having a direct impact on clinical medicine.

At celebrations to mark the 50th anniversary of Professor Metcalf's association with the Carden Bequest, he was described as 'Australia's most distinguished cancer researcher' by Professor Sir Gustav Nossal, who succeeded Dr Burnet as Director of the Hall Institute in 1965 and who promptly brought Professor Metcalf in from the animal house.¹⁹ Sir Gustav said Professor Metcalf was 'a major player on the world scene' whose discovery of the colony stimulating factors (CSFs), hormone-like regulators of white blood cell production, had opened a new chapter in haematology, the science of blood cell formation and function.

'He found these substances, made in only tiny amounts, guide the division and maturation of white cells, prolong their shelf life within blood banks and materially strengthen their function in the body.'

'When cancers, particularly leukaemias and lymphomas, are treated by chemotherapy and/or radiotherapy, white blood cell counts may fall to dangerously low levels, leaving the patients prone to infection or bleeding. The CSFs can help to prevent this and are therefore marvellous adjuncts to cancer therapy, especially where bone marrow transplant is involved.'

'Professor Metcalf is therefore one of the few medical scientists who has seen his discoveries flourish from laboratory bench to the patient's bedside. As a result, he has been showered with honours from many countries, particularly the United States and the United Kingdom.'

Sir Gustav confided that he had tried to convince Professor Metcalf to give the CSFs 'a more sexy name' at one stage:

'I suggested he call them leukopoiетins, to parallel erythropoietin, but his response was typically precise. He said he knew the substances could stimulate the growth of blood cell colonies in the laboratory, but he could not be sure [at that stage] they would stimulate cells to grow in the body.'

Since 1954, donations from a great many Australians in addition to George Carden have enabled the Cancer Council to contribute well over \$20 million to provide salary and research support to Professor Metcalf in the Carden Cancer Research Laboratory at the Walter and Eliza Hall Institute. The Laboratory has set the pace

¹⁹ The celebrations were held at Government House, Melbourne, on 26 November, 2004. The Governor, John Landy, presented Professor Metcalf with a bronze medallion especially crafted for the occasion by sculptor, Michael Meszaros

in cancer research in Australia and remains front-running in its field. According to Professor Metcalf:

‘the Carden Laboratory served as a continuing seed—first for a full Cancer Research Unit [at the Walter and Eliza Hall Institute], then the Ludwig Institute [which established a branch in Melbourne], then the Cooperative Research Centre for Cellular Growth Factors—now an impressive consortium of cancer research groups with distinction. These are genuine products—once removed—of the Carden Laboratory.

Related to this is the generation within the Laboratory of a series of research workers now distinguished with their own groups—Moore and Stanley in New York, Warner in San Francisco, Nicola, Burgess and Gough in Melbourne etc. The Anti-Cancer Council’s input has therefore not simply been on research done in the State [of Victoria] but on a much wider scene via its ‘old boys.’ On the same theme, by creating a new field of medical research, the Anti-Cancer Council has in fact had a major input on international medical research, particularly but not only in haematology.²⁰

The work of the Laboratory represents an epic undertaking that has continued to reap a rich harvest of knowledge and provided a renewed sense of optimism about effective cancer treatments.

Other Cancer Council research funding schemes have provided long-term support to researchers, but the Carden Fellowship is novel in many ways. For one thing, while the Cancer Council oversaw and monitored Professor Metcalf’s work, he was never required to write lengthy reports of his progress or plans. In 1995, he stated that important research advances took decades and not years. Hence the long-term research support and ‘intelligent tolerance’ displayed by the Cancer Council was crucial to his success.

‘There were certainly times when our goals appeared vague and when progress was frustratingly slow, if not almost non-existent. Our goals were achieved with time, but rarely in the sequence intended and rarely were successes predictable. It would have been appallingly difficult to have had to justify the work in many of those 40 years by a detailed grant application to be judged on its likely chances of success in the next 12 months, the situation facing most medical research workers in this country (Australia). This usual type of grant application process is a formula for disaster or deceit . . .

20 Personal communication from Professor Metcalf to Professor Robert Burton, Director of the Cancer Council, 10 July 2000

Forty years of undemanding support saw the transformation of a speculative project on the nature of leukaemia evolve into new clinical methods for supporting the treatment of large groups of cancer patients.’²¹

In his view, the Cancer Council’s management of the Carden Fellowship showed how research should be supported. It created a model of which Victoria could be proud and the rest of the world ‘would do well to copy’.²²

John Colebatch and the evolution of the Centre for Clinical Research in Cancer

As a young physician training in London in 1938, Dr John Colebatch saw his first case of childhood leukaemia, a condition with a cruel image because it was invariably fatal within months of diagnosis. He learned to perform marrow puncture of the sternum, the flat narrow bone in the front of the chest, and undertook a project to determine the normal bone marrow profile of 50 infants and children in good health.

After returning to Australia from wartime duties, he started clinical work in Melbourne and quickly put his knowledge of bone marrow and its disorders to work. In 1946, he treated the first of what turned out to be hundreds of patients with childhood leukaemia, ordering a blood transfusion to ease the distressing symptoms.

A few years later he read reports of new drug treatments that extended the lives of leukaemia patients from about three months to five months or more after diagnosis. In 1948, he started working with these treatments, which reduced complications of the disease rather than dealing with leukaemia’s immediate effects on the bone marrow.

This was a time of rapid pharmaceutical development and within a few years new types of drugs were available that attacked the abnormal white blood cells characteristic of leukaemia. Dr Colebatch was one of the first physicians in Australia to prescribe the new treatments, collectively known as chemotherapy. Although he regarded their use in leukaemia as a major advance, he wanted to find out which chemicals, in what dose, and for what duration could bring about an improvement of symptoms in his patients most reliably. At that stage, the idea of producing a remission and curing children of their leukaemia seemed a distant hope.

21 Don Metcalf, ‘Forty Years of Cancer Research’, *Fellowship Affairs*, September 1995, pp. 7–8

22 Booklet, *Professor Don Metcalf: Celebrating 50 years of Cancer Research*, distributed at 50th anniversary celebrations, 26 November, 2004

The chemical therapies were difficult treatments for all concerned, involving numerous blood tests, an ever-present threat of serious side effects arising from severe bone marrow damage, and meticulous record and data handling. In seeking the consent of parents to allow the treatment, Dr Colebatch spoke along these lines: 'This treatment is new—a man in America says it's producing improved results. He hasn't claimed any cures but you've got to start somewhere—you never know they may be curing someone in a couple of years' time. We can do the same thing here now and it will involve a lot of blood tests and so on, but not an operation as a rule—nothing more serious'.²³

Dr Colebatch's efforts were controversial and raised ethical concerns which have since recurred with other chemotherapeutic agents. Was it preferable to continue with the existing approach of providing symptom relief and allowing nature to take its course, or should attempts be made to prolong life with the ultimate aim of a cure, even though until that goal was reached many patients would die after a short reprieve and substantial discomfort?

During 1957, Dr Colebatch discussed his work informally at the Saturday medical seminars Dr Keogh organised at the University of Melbourne medical school. Dr Keogh's continuing interest in the statistics of cancer was evident in his use of Cancer Registry data to begin proceedings at such seminars, enabling him to provide statistical profiles of cancer incidence by site that formed the main subject of most meetings.

Dr Colebatch convinced some doctors about the value of chemotherapy in childhood leukaemia while others remained uncertain. By 1959, there was definite evidence that chemotherapy was prolonging life by months and sometimes years. Dr Colebatch successfully applied for a Cancer Council Research Grant-in-Aid to facilitate a clinical study at the Royal Children's Hospital involving all children admitted with leukaemia. The following year he achieved his first long-term relapse—which, in retrospect, was a cure.

He had an opportunity to gauge world thinking on chemotherapy for childhood leukaemia and other cancers in 1962 when he was awarded the Cancer Council's Robert Fowler Travelling Fellowship. During a period of three-and-a-half months he visited centres in Europe, America, Asia and New Zealand and studied the US National Cancer Institute's approach to organising studies in multiple research centres.²⁴

23 John Colebatch, extract of interview with Dr Nigel Gray, 29 Nov 1993

24 John Colebatch, Report on Robert Fowler Travelling Fellowship, 1962

Flushed with enthusiasm about promising new drug therapies and new approaches to drug administration, he applied for, and won, Australian Cancer Society support for a trial of chemotherapy in childhood leukaemia involving 15 paediatric hospitals and departments nationwide. The ACS-sponsored trial proved to be a milestone in Australian medical history, being the first formal randomised clinical trial of any kind conducted nationally. The study compared the outcome for patients with acute leukaemia when given four drugs in sequence in two different ways (cyclic versus non-cyclic administration). It showed that the drug vincristine could maintain remission. Furthermore, it aroused professional interest in cooperative clinical trials.

In 1967, Dr Colebatch was appointed the Cancer Council's inaugural W J Kilpatrick Cancer Research Fellow. His consequent overseas travels convinced him of the need to create multidisciplinary clinics to improve the treatment of childhood leukaemia. It took 10 months to establish the Haematology Research Unit at the Royal Children's Hospital, but the effort was well worthwhile. The duration of remissions increased and the general comfort of the children also improved.

The unit was soon involved in six linked studies of chemotherapy for leukaemia and a study of the impact of radiotherapy to prevent or limit infiltration of leukaemia into the brain and spinal cord. By 1972, it was clear that almost all the drugs capable of destroying leukaemic cells achieved their treatment effect mainly by their action on one or more phases of the leukaemic cells' generation cycle. This understanding of the underlying process of chemotherapy opened up the possibility of timing drug administration optimally to achieve maximum cytotoxic effect. By 1973, doctors were inducing cells to enter the cycle in which they could be damaged or destroyed most readily and were synchronising chemotherapy with this most vulnerable part of the cell generation cycle. By the following year, they could advise with increased confidence when particular patients could come off their chemotherapy, having been disease-free for a number of years. Not surprisingly, the Haematology Research Unit was used as a model by other Australian hospitals involved in chemotherapy research.

Studies such as those Dr Colebatch helped establish broke new ground in chemotherapy, radiotherapy and immunological therapy and highlighted the need for improved training of doctors in emerging cancer treatment methods. In response, the Cancer Council's Medical and Scientific Committee established a sub-committee whose brief was to explore all aspects of the development of clinical oncology in March 1976. Three months later, the Victorian Chemotherapy Co-operative Group (VCCG) was established under the Chairmanship of Dr Doug Pearce, with Dr Colebatch as inaugural Executive Secretary. It emphasised cooperation in the

development of chemotherapy—which was still regarded as an experimental method of cancer treatment in Australia.

In 1977, Melbourne haematologist Dr Max Whiteside was appointed VCCG Chairman. He and Dr Colebatch worked to establish a Breast Study Committee during the following few years, which advised, assisted and coordinated the running of chemotherapy studies for breast cancer. Once again, Dr Colebatch's experience with childhood leukaemia came into its own, for all the most effective drugs for breast cancer had been used for some years to treat acute leukaemia. Drs Whiteside and Colebatch also helped establish a Head and Neck Protocol Sub-Committee, which investigated the place of chemotherapy in head and neck cancers; a Lung Cancer Study Group; and a Gastrointestinal Study Committee.

A name change in 1981 to the Victorian Cooperative Oncology Group (VCOG) signalled a widening of interest beyond chemotherapy to all aspects of cancer treatment and associated medical education. Professor Richard Lovell, the recently retired inaugural University of Melbourne Professor of Medicine, took over from Dr Colebatch as Executive Secretary of the VCOG in 1982, serving in that capacity until 1995. Professor Lovell was instrumental in establishing the Urological Study Committee, reconvening the Lung Study Committee—which had effectively stopped functioning—and in forming a Genetics Advisory Committee, which spear-headed Victoria's first study of developments in genetic testing and counselling.

During the 1980s, the VCOG played a major role in the establishment of Victoria's Mammographic Screening Program. It was also closely involved in the design of national and international clinical trials, and policy development on cancer support groups and unconventional cancer treatments. Another major contribution was its collaboration with the Education Unit on information booklets about various types of cancer.

Professor Lovell described the VCOG as Victoria's 'Cancer Parliament' because it provided a forum for cancer researchers and clinicians from many institutions to examine cancer issues on neutral territory. The ensuing discussions resulted in the development of best practice guidelines, vital exchanges of information on treatment trends, and collaboration in clinical trials.

The Cancer Council built on the achievements of the VCCG and the VCOG in 1997 when it established a Centre for Clinical Research in Cancer. This centre 'without walls', advised the Cancer Council on clinical aspects of cancer with special reference to prevention, screening, diagnosis, treatment, palliative medicine and professional education. It promoted the development and use of evidence-based treatment in cancer and encouraged collaborative clinical research, the rapid dissemination of research results and cooperation in the development of cancer genetics services. It

also encouraged oncology treatment centres to adopt prospective data collection procedures, thus providing a means of establishing treatment effectiveness.

Subsequently, the Cancer Council used its reputation and the professional people it employs to oversee other important structures and processes for conducting cancer research in a coordinated way. It managed the Victorian Breast Cancer Research Consortium, a State Government initiative established to carry out laboratory studies on breast cancer. The consortium functioned as another ‘institute without walls’, its independent board of management and scientific committee overseeing breast cancer research groups located at several Melbourne medical research institutes.

Increased funding for research

In 1955, Sir Peter MacCallum (knighted in 1953 for his services to medical education) stated that since 1936 the Cancer Council had spent over £100,000 on cancer research along with services to patients and other aspects of cancer control. The fact that nearly a third of this sum had been disbursed since 1952 reflected ‘the rapidly increasing activity’ in the Cancer Council’s ‘fight against cancer’²⁵.

The general increase in activity paralleled the research outlay. From 1948 to 1958, research funding increased by an impressive 33% in each successive year. Even so, Dr Keogh for one wanted to do more in the research area, as indicated by a letter to Sir Macfarlane Burnet in late 1958 concerning the continued financing of leukaemia research at the Walter and Eliza Hall Institute. Dr Keogh wrote:

*‘My outstanding difficulty will be to persuade my organisation to find the money. I think I can do this but it means canvassing independently every member of my Executive Committee ... I think it would take two to three months for me to get my friends favourably disposed ... It is a pity people are so difficult—but they are.’*²⁶

In 1959–60, following the successful Cancer Appeal the preceding year (which raised £1.35 million, equivalent to over \$20 million today), the Cancer Council’s financial position was more secure and it declared that 75% of funds raised would go to research. This resulted in an outlay of £102,000 for research and travel grants the following year, a large portion of which was directed to the work of Drs Metcalf and Colebatch on cancer immunology and leukaemia treatment, and to the University of Melbourne’s Pathology Department, where researchers were using varied approaches to investigate the origins and induction of cancer.

25 Peter MacCallum, ‘Years of Progress’, *Cancer Council Annual Report*, 1955

26 Quoted by Lyndsay Gardiner in *E V Keogh, Soldier, Scientist and Administrator*, Hyland House, 1990, p. 115

Dr Keogh's successor, Dr Nigel Gray, was also committed to a strong research program and in this had the full support of the Cancer Council. This commitment was reflected in a more than four-fold increase in real terms for research funding between 1968 and 1995. Under Dr Gray's leadership, the Cancer Council moved increasingly to a research policy that provided long-term support for promising cancer researchers along the lines of the Carden Fellowship. An example was the establishment of the Sir Edward Dunlop Cancer Research Fellowship, which provided research funding to Dr David Vaux at the Walter and Eliza Hall Institute from 1994 to 1999 and to Dr Andrew Roberts from the Royal Melbourne Hospital and the Walter and Eliza Hall Institute for the following five years.

In 1999, the Cancer Council funded cancer research to the tune of \$7.5 million (well over half the annual income of \$12 million). In that year alone it funded 36 grants and fellowships, and contributed to 61 researchers studying biomedical aspects of cancer.

Support for researchers in existing centres

From the early 1950s, the Cancer Council funded a wide variety of research studies under its Research Grants-in-Aid program. Funding was provided for one or three years and distributed on the advice of the Medical and Scientific Committee. Initially much of the research was biological in nature, with a major focus on human and animal tissue disorders, particularly cancer. From the 1960s, research projects on psychological, nutritional and genetic aspects of cancer also received funding.

Whereas the Medical and Scientific Committee traditionally advised the Cancer Council on research spending, the Executive retained a strong interest in research policy. This was formalised in 1959 with the decision that the Executive would take responsibility for research policy after seeking input from the Medical and Scientific Committee. Three categories of support were defined—Research Grants-in-Aid, Fellowships and Travel Grants—which were funded from general income or special trust funds arising from bequests and donations. Several examples of research supported by Fellowships have been described previously, including the work of Drs Metcalf and Colebatch. In addition, the Cancer Council provided other named fellowships and scholarships.

The following examples indicate the sorts of research conducted with the Cancer Council's support:

- One of the earliest projects to receive support was a study of the effect of radioactive substances and nitrogen mustard on thyroid cancer. Miss M McQuillan and Mrs Pam Todd, under the supervision of Professor Victor Trikojus, the head of the University of Melbourne Biochemistry

Department, obtained the radioactive agents from the Commonwealth X-Ray and Radium Laboratories. A similar study undertaken by Dr Kaye Scott examined the use of nitrogen mustard injections on lung cancer.

- At the University of Melbourne School of Pathology, Dr Joe Freidin, who had been an outstanding medical student, made an intensive anatomical study of cancer of the rectum. From 1952–54 he dissected a large number of tumours removed at operation.
- Another project in the Pathology Department saw Dr Brian Fleming study liver tumours from clinical, pathological and statistical viewpoints. Dr Fleming later served as Chairman of the Executive Committee for a period ending in 1999.
- Towards the middle of 1955, Dr Peter Hughes, a Fitzroy general practitioner who wished to devote the rest of his career to cancer research, attended the University of Melbourne Pathology Department several days a week to work on the cancer-causing potential of a large number of manufactured organic chemical compounds. Although Dr Hughes initially improvised where equipment was concerned, he eventually persuaded the University to extend its special facilities for experimental work. His PhD thesis on the mechanism of cancer generation by amino-azo dye relied on advanced biochemical techniques. His findings were considered an important contribution to the area of cancers influenced by chemicals. Soon after the conferring of his PhD, he undertook further studies in the US with the help of the Arthur A Thomas Fellowship.
- Dr C J Louis joined the University of Melbourne School of Pathology in 1956 and collaborated closely with Dr Hughes. With support from the Cancer Council he worked on methods to distinguish between normal and abnormal thin sections of tumours. He also investigated 200 cases of leukaemia in man and animals.
- Dr Anne Jabara was another in the School of Pathology to receive support from the Cancer Council. Dr Jabara's thesis focused on spontaneous and induced breast tumours in dogs and her work led to her becoming one of Australia's only pathologists specialising in canine cancers.
- In the early 1960s, the Cancer Council funded Dr Godfrey Gardner from the University of Melbourne's Psychology Department to conduct a survey of public attitudes towards cancer and the effect of public education programs. Other colleagues at the University evaluated aspects of the Cancer Council's public education methods. For example, in an innovative study, Mr Newman Rosenthal and colleagues from the University's

Audio-Visual Aids Department examined the degree to which the cinema successfully communicated facts and concepts about cancer to various types of audience. This study also assessed the degree to which a cancer message's presentation increased tendencies to seek early medical advice about cancer.

- In the late 1960s, Drs Albert Baikie and Dr Alexander ('Sandy') Spiers from the University of Melbourne Department of Medicine at St Vincent's found and named a chromosomal abnormality associated with the occurrence of malignant lymphomas, including Hodgkin's disease. Their colleague, Dr Margaret Garson, started cytogenetic studies on malignant lymphomas and leukaemias in 1968 and received continuing support for this work.
- In the 1970s, Drs Joe Bornstein and John Swan from Monash University examined the chemical constituents of cigarette smoke and Dr Henry Burger from Prince Henry's Hospital Medical Research Centre investigated pituitary and gonadal hormones in cancer.
- Immunological aspects of cancer attracted the interest of Professor Richie Nairn from the Monash Department of Pathology and Immunology in the early 1970s and Professor Ian McKenzie from Melbourne University's Department of Medicine at the Austin Hospital in the early 1980s.
- In the mid-1970s, Miss Barbara Donnelly from the Royal Melbourne Hospital studied levels of physical and social functioning in patients treated for haematological cancers. Around the same time, Mr Bernard O'Brien from the St Vincent's Hospital Department of Surgery investigated microscopic surgery of veins and lymph vessels, research that was to have implications particularly for the treatment of lymphoedema following surgery for breast cancer.
- For six years starting in 1986, the Cancer Council funded the work of Professor Graeme Young and colleagues at the Royal Melbourne Hospital on the effectiveness of dietary fibre in reducing bowel cancer development in animals and humans.
- Simultaneously, Professor Andrew Kaye and colleagues from the same hospital studied treatment of brain tumours with 'photodynamic therapy'. The treatment relied on tumour cells in the brain selectively absorbing a chemical sensitive to laser light which surgeons could later activate with a laser source.
- The Cancer Council also provided funding to Dr Bill Sheridan for research on G-CSF in peripheral blood stem cell transplants. The major journal

article arising from this work proved to be the fifth most cited reference in the year of publication in *The Lancet* medical journal.

- In the 1990s, Dr Ismail Kola and colleagues from Monash studied a possible genetic link to Ewing's sarcoma and acute myeloid leukaemia, two forms of cancer common in children that can be treated more effectively when diagnosed early.

The following examples describe the sorts of research conducted with Travel Grants:

- Dr Reg Motteram, a pathologist at the Cancer Institute, studied experimental cancer research in England and the US from January to July 1951. On his return, he spoke at a joint meeting of the Medical and Scientific Committee and the Executive Committee, describing his impressions of research underway at highly regarded centres including the Imperial Cancer Research Fund, London, and the Sloan Kettering Institute in New York. A comprehensive report on the meeting, published in *The Medical Journal of Australia*, ensured Dr Motteram's insights were widely disseminated.
- In the late 1950s, Dr Hans Bettinger studied cancer pathology in Europe and the US while Mr N S Hohlov studied electron microscopy in Britain.
- Around the same time, Professor Oscar Oeser, Foundation Professor of Psychology at the University of Melbourne, received a travel grant to the US and UK where he studied methods of public education about cancer and evaluation of this type of work.
- Breast surgeon, Mr Tom Ackland, studied breast cancer management, including non-surgical treatments in the UK, Europe and US centres in 1961. Mr Ackland, a Robert Fowler Travelling Fellow, also investigated the value of cancer detection centres and public education programs.
- In the same year, Dr Saul Wiener, a researcher on immunology of tumours, won the Arthur A Thomas Research Fellowship, which he used to visit the Columbia University Cancer Research Institute, New York.
- A special grant to general surgeon, Mr Victor Stone, head of the Austin Hospital's cancer unit, enabled him to visit the US and a number of European countries in 1961. He investigated the value of cancer detection centres, public education techniques and palliation in advanced cancer.
- Another Robert Fowler Travelling Fellow, Dr Tom Hurley, established a clinic at the Royal Melbourne Hospital to treat patients with leukaemia

and lymphoma after studying similar clinics in England and the United States in 1967.

- Plastic surgeon, Dr Donald Marshall, returned in 1966 from a Robert Fowler Travelling Fellowship convinced that reconstructive surgery should be attempted in the same operation as head and neck cancers were removed, rather than some months later, which was the normal practice at the time.

During the 1970s, the Cancer Council received generous financial support from Victorian Lions Clubs. This resulted in the establishment of a Research Fellowship at the Walter and Eliza Hall Institute to be allocated at the discretion of the Director. The Lions Fellowship became the second longest continuously supported Fellowship at the Institute, after the Carden Fellowship. As an example of the uses to which the Fellowship was put, the 1996 winner, Dr Andrew Elefanty, studied genetic manipulation techniques to develop models of leukaemia in mice.

Major Cancer Council Named Fellowships and Special Projects

- Carden Fellowship, established 1948 following a bequest from Mr George Carden. Held since 1954 by Dr Donald Metcalf
- Arthur A Thomas Fellowship, started 1961
- W J Kilpatrick Fellowship, started 1967, named to honour Sir William Kilpatrick
- Lions Fellowship, started 1977, made possible by funds from Victorian Lions Clubs. Awarded to the Walter and Eliza Hall Institute to be allocated at the discretion of the Director
- Fraser Fellowship
- Sir Edward Dunlop Fellowship, established by a special appeal to honour long-standing patron and supporter, the late 'Weary' Dunlop. This five-year Fellowship is awarded on a competitive basis to a post-doctoral scientist by the Executive Committee on the advice of the Medical and Scientific Committee. It is based on the academic achievements of the applicant and his or her laboratory.

The Cancer Council's research policies and practices examined

Over a period of 50 years, the Cancer Council awarded hundreds of Grants-in-Aid to researchers throughout Victoria. But how effective were they? In 1987, Dr Gray asked Dr Colebatch to examine a small number of grants and their outcomes in order to assess the feasibility of answering retrospectively the following three questions for

the Grants-in-Aid program: Who was trained by the project? How much did the Cancer Council spend? Was a discovery made by the project and, if so, what was it? Dr Colebatch examined the periods 1970–72 and 1975–77 and concluded that it would be possible to make such an assessment using the National Citation Index.

Although a complete study of the sort Dr Colebatch considered feasible was not conducted at the time, a 1999 Australian National University analysis provided reassurance about the Cancer Council's approach to awarding grants. This independent study quantified for the first time the contributions and 'impact' achieved by agencies in Australia that fund medical research.²⁷ It showed that research studies the Cancer Council funded were successful in attracting more citations in high-impact journals than the worldwide average. (Papers cited or quoted by other researchers in quality medical and scientific journals suggest they are authoritative.) The Cancer Council received the highest ranking in the 'more than 100 publications' category, indicating its grants for research were resulting in work of excellent quality.

Prior to this analysis, the Cancer Council had reviewed its research grant policy for researchers not employed by it. It reaffirmed its intention to foster the further development of the cancer research community in Victoria, to enhance the Cancer Council's position of influence, to provide support to new researchers of excellence, and to promote the best quality research outcomes. It also put in place a detailed protocol for ethical decision-making in research allocation. The protocol helped guarantee that members of the grant-giving committee could not influence any decisions made in which they or their employing organisation had an interest. It also enhanced the confidentiality of decisions made.

In addition, the Cancer Council examined the desirability of offering prizes for research, and of making larger but fewer grants. And attention was given to ensuring that the larger institutions did not monopolise access to funding merely as a result of their size.

Two in-house research centres

The Cancer Council moved in bold new directions in 1986 when it established two in-house research centres, the Cancer Epidemiology Centre and the Centre for Behavioural Research in Cancer. This followed recognition by Dr Gray and other senior members of the Cancer Council that cancer epidemiology and behavioural research were crucial to the aims of the organisation, yet neither area was being fostered adequately through normal grant-giving mechanisms.

27 Butler, Linda, 'Funding Australia's basic biomedical research of 1993 and 1994', *The Medical Journal of Australia*, 1999, 171, pp. 629–33

The centres were a conscious attempt to further develop the research expertise in which the Cancer Council was already an outstanding leader at a national and international level. They were pioneering in the sense that few, if any, cancer prevention bodies anywhere in the world had established in-house research facilities to service the needs of entire jurisdictions. By providing core funding, the Cancer Council encouraged researchers to make the most of opportunities as they arose. Core funding also helped ensure that researchers directed maximum time and energy to doing research rather than to fund-raising for research. Thus liberated in their formative years, the centres later won large external research project grants which enabled them to expand their programs at a time of increasing competition for the charitable dollar.

An important benefit of establishing the centres was the encouragement they gave to collaboration between behavioural scientists, epidemiologists, health educators and health promoters, each disciplinary group enriching the perspective and work of the others. They cemented the already strong linkages between education programs, early detection programs and research.

Both centres reported to the Cancer Council's Executive Committee every six months and to the Medical and Scientific Committee annually and they were reviewed by an international panel approximately every five years.

The **Cancer Epidemiology Centre (CEC)** took on the administration of the Victorian Cancer Registry with the Director, Dr Graham Giles, providing policy direction and supervision. Using data generated by the Registry, the CEC produced a range of publications for professional and lay groups. These included annual statistical reports and monographs showing Victorians' experience of cancer by site and type, publications on cancer incidence and death rates across the state, and regular epidemiological reviews on various cancers with an emphasis on the Victorian situation.

The CEC also collaborated on national and statewide surveys of cancer treatment (especially of colorectal and lung cancers) and developed special interest registries, for example dealing with small breast cancers, lymphoma, brain tumours and the inherited bowel cancer syndrome known as familial polyposis.

Its major programs throughout the 1990s were the Health 2000 study, designed to examine the impact of the Mediterranean diet on cancer rates in Australia, and a program of research into prostate cancer. The Health 2000 study followed indications from other studies that diet might explain the relatively low risk of cancers of the bowel, breast and prostate in some populations. However, the evidence was insufficient to confidently recommend particular dietary practices.

After a pilot study in 1988 demonstrated the feasibility of monitoring dietary patterns among individuals who migrated to or were born in Victoria, the CEC embarked on a longitudinal study in 1990. It took baseline health-related measurements on 42,000 participating men and women aged from 40 to 69 years, 28% of whom were born in southern Europe. It then followed the diet and health of these individuals through regular mail and/or telephone contact. By 2000, from linkage to the Victorian Cancer Registry, it had information that around 1000 participants had died and 1500 had developed a cancer. Statistical analyses were ongoing.

The prostate cancer program once again was based on long-term follow up of individuals. It examined a range of possible dietary and genetic factors and sought insights into possible gene-environment interactions.

The **Centre for Behavioural Research in Cancer** (CBRC), under the direction of Dr David Hill, set itself the tasks of conducting research to improve the quality and effectiveness of Victoria's cancer control programs, including those dealing with cancer prevention, early detection and non-medical aspects of patient care. It encouraged collaborative research on behavioural aspects of cancer prevention and, in particular, the application of a small number of simple but effective principles of behaviour change. And it trained research students and contributed to the national and international world literature on behavioural research related to cancer. The policies and programs of the Cancer Council's Education Unit, which Dr Hill had previously headed, were the forerunner to the CBRC.

From the outset, the CBRC's major research focus was smoking behaviour and it worked closely with the official Victorian Smoking and Health Program. It monitored behaviours and attitudes relevant to smoking prevalence, described the circumstances surrounding smoking uptake and relapse, and studied the transition from experimental to regular smoking. It also planned and evaluated health education campaigns and provided input into the development of interventions to help smokers quit, then conducted studies to determine the impact of these quit smoking measures. Other smoking-related areas of research concerned the impact of changes in public policy, such as responses to laws governing smoking in enclosed spaces.

In the mid-1990s, it was deeply involved in a major initiative by helping develop an \$8 million national anti-smoking advertising campaign (the National Tobacco Campaign), the largest in the history of Australia. Under the Chairmanship of Dr Hill, and overseen by Federal Health Minister, Dr Michael Wooldridge, the 'Every Cigarette Is Doing You Damage' campaign went to air in mid-1997 with a series of confronting but honest television advertisements plus extensive newspaper and radio advertising that continued for six months.

This was coupled with an upgraded Quitline service, which an extensive evaluation showed had significant impacts on smoking behaviour.

Another major focus for the CBRC was sun protection behaviour, a priority in cancer control in Australia because of the enormous burden of illness from non-melanotic skin cancer and melanoma. It identified behavioural and non-behavioural causes of skin cancer and on this basis embarked on a comprehensive SunSmart solar protection program.

A further aspect of the CBRC's work was to research behavioural aspects of early detection of breast and cervical cancers. It documented the treatment of breast cancer by surgeons and showed that between 1985 and 1995, the proportion of women with early breast cancer treated with breast conserving surgery actually doubled. Moreover, it highlighted areas of concern where the data suggested some surgeons may not be managing breast cancer optimally.

Other CBRC studies examined the process of adjustment to cancer and efforts to enhance patients' coping behaviour.

Further in-house units

As 2000 approached, the Cancer Council strengthened two other units with a research component, its Cancer Education Unit and a Patient Services Development Unit. The Cancer Education Unit collaborated with the CBRC and the CEC in designing and implementing programs aimed at changing individual and population behaviour. The Unit also included a large service element and auspiced the SunSmart and Women's Health Programs and, until the end of 1997, the Cancer Information Service (which then became a unit in its own right). The Patient Services Development Unit developed patient services which from time to time involved research in association with the CBRC or CEC.

In 1999, following a competitive process, the Cancer Council and its collaborators won \$500,000 per annum for five years from the Victorian Health Promotion Foundation to establish the VicHealth Centre for Tobacco Control. The consortium comprised the Cancer Council, the Monash University Institute of Public Health and Health Services Research, and the University of Melbourne's Centre for Policy Studies. With Dr Ron Borland as Director, the Centre set about studying the social, legal and economic aspects of tobacco use.

The Cancer Council consolidated its in-house cancer control science units in 1999 when it established the Cancer Control Research Institute. The term 'cancer control research' referred to the spectrum of research including the behavioural, social and population sciences that reduced cancer risk, incidence, sickness and death either alone or in combination with biomedical approaches. The Cancer Council's

Director, Professor Robert Burton, said the Institute aimed to fill major gaps in understanding cancer risk factors. Other major objectives included improving the tools and channels used to communicate information about cancer, and enhancing cancer treatment outcomes and experiences.

Reviewing the results of cancer research

The Cancer Council's research program made a difference on many levels. In the first place, it helped harness approaches to cancer prevention using insights from biology, education, psychology and epidemiology.

Its research program also helped improve awareness of cancer prevention, early detection and treatment. Reminiscing on five decades of work with the Cancer Council, Mr Allan Dick remarked in 1998 on the cultural shift and sea change in knowledge about cancer causation, prevention and treatment that he had observed during his association with the Cancer Council.

*'We know how to prevent most lung cancers if we can only persuade young people not to become smokers and adults to cease smoking. We know that being 'sun-smart' can prevent or lower the risk of melanoma if we can only persuade people to protect themselves and their children from excessive exposure to the sun. Early detection of pre-cancerous conditions of the uterus through Pap smear programs and cytological analysis has resulted in a dramatic reduction in deaths from uterine cancer. Mammacheck and mammographic screening programs have improved survival rates from breast cancer. Effective treatment with anti cancer drugs is enhancing breast and colorectal cancer survival.'*²⁸

Third, Cancer Council-funded research helped identify new facts and principles of cancer causation and treatment previously baffling mankind, thereby opening up whole areas of medicine that proved to have immense clinical significance. The work on blood growth factors and on chemotherapy for leukaemia exemplified the ways in which research conducted with Cancer Council support directly influenced patient care and survival.

A fourth result of the Cancer Council's program was heightened collaboration between researchers from the same and different disciplines and from many institutions. Cooperation between clinicians meant Victoria made major contributions to treatment studies and to the development of practical guidelines for the management of cancer situations and assessments of treatments undertaken.


28 Anti-Cancer Council *Annual Report* for 1998. See also W, Allan Dick, *60 Years of War against Cancer; Recollections and Reflections*, Anti-Cancer Council of Victoria, 1996

The initiatives in building research capacity resulted in improvements in the skills-base of scientists and clinicians within the Victorian community. Sponsorship across the breadth of research fields related to cancer helped push Victoria into prominence in many areas of biomedical and psychosocial research.

The research program also helped establish standards of cancer research. On numerous occasions, research activities funded in whole or part by the Cancer Council acted as a template for other states or countries wanting to embark on new approaches in cancer education, prevention, detection and treatment. They also provided examples of achievable standards of research design, data collection and on-going appraisal, and of the application of research findings to human health and well-being.

Reflecting the success of these achievements, government and private financial supporters of cancer research continued to back the Cancer Council, recognising that its independent competitive peer review funding processes ensured that funds for research were used strategically, even-handedly and broadly.

While the early history of the Cancer Council was enlivened by debates about the funding of research, by the beginning of the twenty-first century the organisation was invigorated by the research outcomes achieved. As a side-benefit it could point to hard-won lessons learned in the preceding sixty-plus years—the selection of people with exceptional research capabilities and the drive to follow through despite difficulties, and the need to provide funding to researchers long-term, meaning for from five years to many decades.



Part Two

Pushing the limits': the extraordinary life and achievements of Don Metcalf

He's one of Australia's most talented and successful scientists, a 'must have speaker' at international meetings on cancer treatment, and still—at age 75—capable of attracting some of the best minds in the world to work with him at The Walter and Eliza Hall Institute of Medical Research in Melbourne.

Yet to most Australians, the name Professor Donald Metcalf means nothing. Why is it that so little is known of the man who has done more than any other to discover how our multi-talented blood cells take on their many roles in the body? Why don't we automatically think of him when mention is made of exciting developments in cancer treatment? After all, the new blood cell regulators that he played a major part in discovering and applying have been used to treat four million cancer patients worldwide during the past 15 years, with clear gains in survival.

It's partly a case of the subject matter. Blood cells and their development from undifferentiated stem cells to fully-fledged adult cells are unfamiliar territory to most people and a conversation about his work can involve demanding concepts and jargon.

There is, however, another important reason for Metcalf's virtual anonymity, which is that he has never sought notoriety. This reflects his natural inclination to put as much time and energy as possible into his scientific work.

Born in Mittagong, New South Wales, in 1929, the middle child of school teachers—one of whom (his father) was a Scottish migrant—he gained the ethos of 'keeping your nose to the grindstone' at a young age. He started school at three, sitting in the back of classrooms, and completed his secondary education at 16, having been made to repeat the third and last years of high school so that he would not graduate at 14.

Medical studies followed at Sydney University, and the habit of keeping his mind on the job and avoiding diversions was reinforced by the tough competition he faced as one of 650 students in the first post-World War II medical class. It was sink or swim for members of the class who had no new textbooks and who shared a skeleton chained to a post in the middle of the anatomy museum (for the purpose of study).

Metcalf always regarded himself as independent and stubborn, a result of constantly coping with new schools and peer groups during his childhood and adolescence. (He went to four high schools because his father's teaching appointments meant travelling from town to town.) 'You never made any lasting friendships,' he told the Australian Academy of Science a few years ago, 'because every time you moved to a different part of the country you started all over again. I was in effect an enforced loner.'²⁹

A year spent on a research project during his medical course convinced him that solving problems about human biology was where his future lay and, in 1954, he was awarded the Carden Fellowship in Cancer Research by the Anti-Cancer Council of Victoria (now The Cancer Council Victoria). He is, in fact, the one and only Carden Fellow the Cancer Council has ever appointed, so productive and successful has he been. [Refer to the Afterword for an account of a major celebration in 2004 to mark his outstanding research record over these 50 years.]

As a condition of the Fellowship, Metcalf was required to serve an apprenticeship with the redoubtable Professor Frank Macfarlane ('Mac') Burnet, Director of the Walter and Eliza Hall Institute (and later a Nobel laureate and knight). But before long, Metcalf and Burnet fell out as:

*'In his [Burnet's] view, anyone undertaking cancer research was at best misguided and to pursue cancer research in his Institute certainly required a rather circumspect approach under a somewhat disapproving eye.'*³⁰

Metcalf's circumspect approach led to his spending some eight years—until Burnet retired in August 1965—'exiled' in the 'laboratory suite' of the Institute's animal house. It was fairly inaccessible and remote from Burnet's gaze, which suited Metcalf.

The eldest of his four daughters, Kate, recalls visiting her father's workspace on Saturday mornings in the early 1960s. 'You got to it through a tunnel under the [Royal Melbourne] hospital that reminded me of a dungeon,' she says. 'Then the pong would hit you. For me, that was the smell of work. There were chooks, sheep and rabbits downstairs and mice upstairs. The humans and mice were all mixed together.'

Metcalf's office and laboratory were poorly ventilated and adjoined a room where thousands of mice were housed. Although he believed in being near the mice, as that was really the only way to assess their response in experimental studies, he developed

29 AAS Interview with Professor Donald Metcalf <http://www.science.org.au/scientists/dm.htm>

30 Don Metcalf, 'The Colony Stimulating Factors – Discovery to Clinical Use', The Burnet Lecture, 1993

an allergy to them which made his nose and eyes stream. The close contact with animals also led to chronic hay fever and sinusitis. 'But nothing would stop him working with them,' says Dr Margaret Holmes, who helped manage the animal facilities at the Institute from 1958 to 1986.

In seeking to investigate the uncontrolled growth of cells—the very crux of cancer—Metcalf decided to focus on cancers of the blood, collectively known as the leukaemias, since blood is the body's most accessible tissue. The more he got into it, the more he recognised how crucial it was to understand normal blood cell production.

In 1964, Metcalf and Dr Ray Bradley from the University of Melbourne devised a simple, reproducible method for growing living colonies of cells from the bone marrow. This represented an important advance, as the bone marrow gives rise to the body's rich variety of white blood cells. These cells in turn provide protection from life-threatening infection and their depletion can result in death. It was the first time access to these cell colonies had been achieved anywhere in the world, and it made possible exciting new types of experiments. Equipped with this tool, Metcalf and his colleagues gradually resolved many mysteries of white blood cell formation and development.

During the next four decades, Metcalf regularly spent 12 hours a day at his microscope, studying countless cell colonies growing in semisolid agar gel. Dr Nick Nicola, who joined Metcalf's unit in the late 1970s, believes microscopic examination of cell colonies, rather than indirect methods of investigation, was important in the group's ultimate success. 'You don't get so easily misled by artefacts and you see additional things happening that you may never have suspected,' he says. 'I think some things we discovered would have been slower, and some of the serendipitous things might never have been discovered.'

The unit discovered various substances in the blood that could trigger bone marrow differentiation and maturation and these came to be known as the colony stimulating factors (CSFs). When CSFs are added to living colonies of cells, they cause the colonies to grow in intriguing and beautiful ways resembling, in Metcalf's words, 'galaxies as approached by a fast-moving spaceship'.³¹

His desperation to get the next set of results has inspired many younger colleagues. As an Honours Science student, Doug Hilton worked under Metcalf in the 1980s on purifying leukaemia inhibitory factor (LIF), one of the CSFs. 'I was living close to WEHI [the Walter and Eliza Hall Institute] and since Honours is a pretty intense

31 Donald Metcalf, *Summon Up The Blood: In Dogged Pursuit of the Blood Cell Regulators*, 2000, AlphaMed Press, Ohio, p. 7

year, I made a habit of getting into work very early in the morning, often around 5 am,' he recalls. But no matter how early he arrived, Metcalf was always there.

One morning in the middle of winter, Hilton thought he finally had Metcalf's measure. 'When I walked across Royal Parade in the cold and the drizzle and entered old WEHI at 4.15 am, I was certain that Don would still be tucked up in his bed. But when I entered the lab, there he was on the other side of the corridor counting colonies.'

Towards the end of that year, as the purification of LIF got closer, Hilton sensed Metcalf's edginess 'to the point that he began hanging around ... waiting for the last drop to be collected before he would whisk them away to be tested.' Hilton, who is now a senior member of WEHI's scientific staff, regarded this behaviour as a wonderful example of Metcalf's passion and dedication. 'The fact that this old man (he was 55 at the time) had worked so damn hard for so long, but still couldn't wait for the next result, had a very profound influence on me,' he says.

Metcalf's wife, Jo, and their daughters have seen his work ethic play out in a variety of ways. Returning from holidays in Sydney, the family would routinely deviate on the long drive home to stop at the Walter and Eliza Hall Institute where Metcalf would pick up his mail. It was like flicking a switch from party mode to work mode, with Metcalf suddenly engrossed in the letters on his lap. As the girls grew up, it was customary for the family to have dinner together but, for some years, their only recollection of his presence in the morning was an overturned bowl on the kitchen draining board and the newspaper folded neatly on the table. According to his daughters, he has only ever fallen foul of the law twice, and that was for speeding—on his way to work!

He was, and is, driven and demands no less of his staff, according to Dr Glenn Begley, who undertook a PhD in Metcalf's laboratory in the 1980s. 'He would walk about the department stimulating people to work harder, saying dryly, "There are people over there (pointing to the Royal Melbourne Hospital) who are dying while you are chattering".'

Ask Metcalf's colleagues what it is that drives him and you discover a consistent refrain: finding answers to important questions by a few simple experiments or, in the words he suggested for the Walter and Eliza Hall Institute's mission statement, 'mastery of disease through discovery'.

Professor Sir Gustav Nossal, who replaced Burnet as head of the Institute in 1965—and brought Metcalf in from the animal house—refers to his 'great steadfastness'. 'He has built up an edifice of knowledge about blood growth factors brick by brick with every new experiment firmly based on previous work,' Nossal says. 'He is the very opposite of a butterfly.'

Other schemes have provided long-term support to researchers, but the Cancer Council's Carden Fellowship support for Metcalf is the longest time anyone involved can recall a fellowship lasting. Nossal applauds the spirit of collaboration and cooperation in which it was given. While the Cancer Council oversaw and monitored Metcalf's work he was never required to write lengthy reports of his progress or plans. According to Nossal, "The Cancer Council has been constant in its support, undemanding and non-interfering. It has shown how research should be supported and created a model of which the state [of Victoria, Australia] can be proud and the rest of the world would do well to copy."

Leading by example has been enormously important in the blood growth factor story. 'He has the ability to attract and develop other scientific leaders,' says Professor Suzanne Cory, a colleague of Metcalf's for 33 years and now director of the Walter and Eliza Hall Institute.

Countless talented individuals have come to work with Metcalf in Melbourne and, almost invariably, he has tested their resolve with his blunt welcome, which manages to combine enthusiasm and dynamism with skepticism. He admits to going into 'larrikin mode' if he thinks his visitor needs 'jolting out of a self-satisfied view of life.'

Nicola tells the story of his first encounter with Metcalf after a stint in Boston. Arriving in late 1976, he called in at the Institute with the intention of introducing himself before officially taking up a position with Metcalf in the New Year. It so happened that the Institute's annual Christmas party was in full swing and when he found his new boss, 'he was a little tipsy and asked if I had had a chance to take a holiday on the way back to Australia. I said my wife and I had managed a couple of weeks in Europe and he replied, "Good, because you won't be having any holidays here for the next three years!"' Nicola wondered what on earth he had let himself in for, but subsequently became one of Metcalf's closest colleagues and his deputy.

Another to experience Metcalf's testing variety of welcome was Dr Tony Burgess, who came to the Walter and Eliza Hall Institute as a starry-eyed and naïve medical biochemist in 1975. 'I arrived at his office door excited and ready for a change into biology,' says Burgess, who now heads the Ludwig Institute of Cancer Research in Melbourne. Astounded at Metcalf's ability to grow living cells in agar and to induce them to mature, he asked where the pure colony stimulating factor was kept.

'Don asked me to wait in his office and, after a few seconds, he was back with a culture tube containing a pair of floating mouse lungs,' says Burgess. "'The CSF is in there," he told me. "Once you've isolated it, you can start the differentiation experiments."' It was another six years before the group obtained and purified the CSF!

Now accustomed to Metcalf's one-liners, Burgess says they are always spontaneous and invariably funny, 'after the embarrassment wears off'.

Begley first met Metcalf in the early 1980s when, as a 27-year-old, he approached him about becoming his PhD supervisor. 'I had just finished my physician's exams and, in his crusty old way, he told me that I was too old to learn anything,' says Begley. After completing his studies he wrote up a good piece of work destined for publication in a top medical journal. He gave it to Metcalf to read overnight and when they started discussing it the next day, his first comment was 'Where are the perforations?' Begley looked confused, so Metcalf explained, "'This is only good for toilet paper" ... and then he laughed.' Begley went on to become a senior Institute scientist and joined the Californian biotech company, Amgen, where, early this year, he was appointed the company's vice-president for global haematology and oncology research.

No-one was spared Metcalf's sardonic sense of humour, even his boss, 'Mac' Burnet. According to Nossal, it was widely known that Burnet was a bit of a show-off. 'One time when Japanese goods were still very shoddy and cheap (perhaps in the early 1960s), Burnet received a high honour from the Emperor of Japan,' Nossal says. It was the Order of the Rising Sun, Second Class, and Burnet let it be known that the only recipients of the First Class version were members of the Japanese Royal Family.

Nossal continues: 'One day he brought the rather beautiful medal attesting to the honour into work. It had a number of inscriptions on it in Japanese characters which Burnet could not read. It was also well-known that Metcalf had had a number of Japanese Postdoctoral Fellows in his laboratory, so Burnet thought Metcalf might have learnt a little Japanese. He passed the medal over to him and said: "Perhaps you could read this inscription". Quick as a flash, Metcalf peered at the medal and shot back: "Yes, Sir Mac. It says, Made in Japan"!'.

There is little doubt that Metcalf, a student of military history, uses his dry wit as a form of attack, as well as defence. He is extremely competitive, Begley says, even competing with the most junior staff in his department should they aspire to his turf. Some consider that Metcalf's motivation to succeed has been strengthened by a desire to prove Burnet wrong. 'Burnet thought Don had lost the plot,' one says. 'He didn't like the way Don's career was developing, and Don said, "I'm going to show the great man".'

Proving himself in the bearpit of competitive science produced many uneasy and frustrating moments. His daughters recall him fretting about work, especially when the incubator in which cell colonies were growing was inadvertently turned off. One daughter, Penelope, recalls asking him what he actually did. 'He said he was looking

for a cure for cancer,' she says. 'I thought he'd lost it (the cure) and I asked him what the likelihood was that he would find it.' When he responded that the chances were one in many millions, she felt very anxious for him.

According to colleagues, Metcalf's bittersweet way of looking at the world has served him well in going out on a limb for the CSF work, despite considerable opposition and lack of progress at times. 'There were dry and difficult periods,' says Cory, 'but he hung on tenaciously when others might well have lost faith in their potential, given up and changed direction.' Adds Nicola, 'There were many ups and downs, but there was palpable relief and satisfaction when the first clinical trials clearly showed the CSFs were valuable clinical agents in stimulating blood cell formation in humans.'

Nossal describes Metcalf as one of the rare group of people who begin investigations to understand the basic nature of things with no thoughts of practical usefulness. 'But as the work progressed it became clear that the substances which he had discovered, the CSFs, might have therapeutic applications, particularly in cancer patients who needed to have their blood count restored following chemotherapy or radiotherapy,' he adds. 'He was quite closely involved in the relevant clinical trials and thus could truly be said to have made a contribution "from the bench to the bedside".'

Notwithstanding his immense individual contribution, Metcalf views himself as a sort of forward scout for a following army rather than a general organising his troops. He dislikes the big battalion approach to science, all guns blazing and cries of 'winning the war against cancer'. In recent years he asked Penelope, an artist, to paint his portrait and sat for her in his white laboratory coat. 'Each time we had a break, I'd let him have a look,' she says. 'I could tell he wasn't very impressed and was fretting about it.' She asked him what was bothering him and he said the portrait made him look too old. "I want it to be about the part of me that led people through battle and about the fight," she recounts. "I don't feel old, I still feel like I'm only 30." Soon after, she painted him standing in front of the Walter and Eliza Hall Institute, hands on his hips and with a skeptical look on his face. The portrait captures the essence of the stubbornly independent scientist who has defied the doubters and pushed the limits to make an epic contribution to understanding and treating cancer.

Professor Don Metcalf: career highlights

- 1929: Born at Mittagong, New South Wales, the middle child of school teachers
- 1932: Starts school at the age of three and learns to read and write
- 1946: Embarks on medical studies at the University of Sydney in the first post-World War II class
- 1950: Interrupts his medical studies to complete a Bachelor of Science (Medical) degree working in the laboratory of Dr Patrick de Burgh, Professor of Bacteriology at the University of Sydney. This experience cemented his interest in experimental pathology and cancer research
- 1953: Graduates in medicine from the University of Sydney and completes residency at the Royal Prince Alfred Hospital, Sydney
- 1954: Appointed the Anti-Cancer Council of Victoria's Carden Fellow in Cancer Research to be undertaken at the Walter and Eliza Hall Institute
- 1956–58: While still Carden Fellow, undertakes further research studies at the Harvard Medical School in Boston
- 1958: Resumes work at the Walter and Eliza Hall Institute
- 1965–96: Heads Cancer Research Unit and Assistant Director, Walter and Eliza Hall Institute of Medical Research
- 1996: Appointed University of Melbourne Professor Emeritus
- 2004: Celebrates 50 years as Carden Fellow

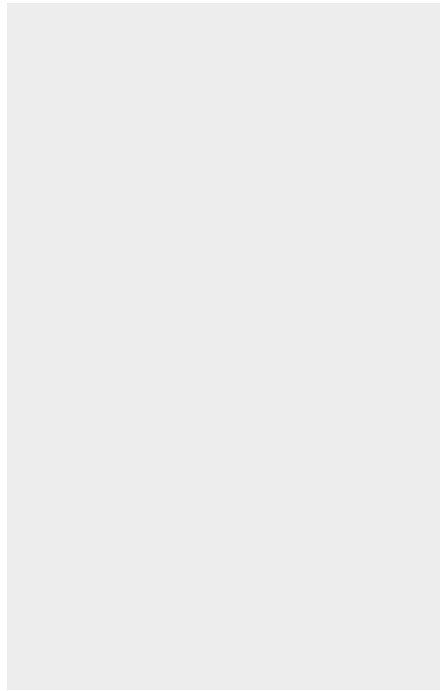
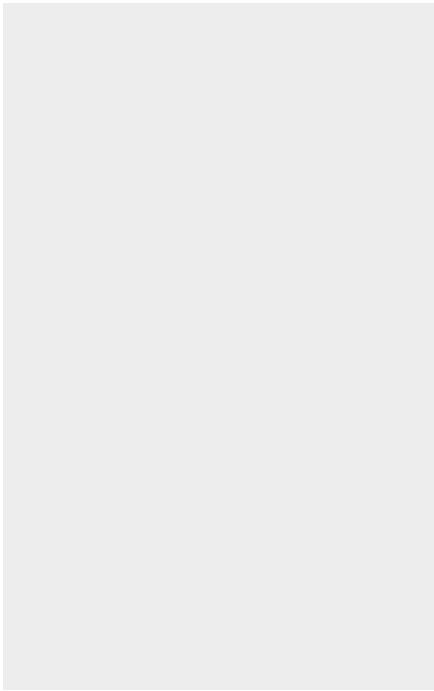
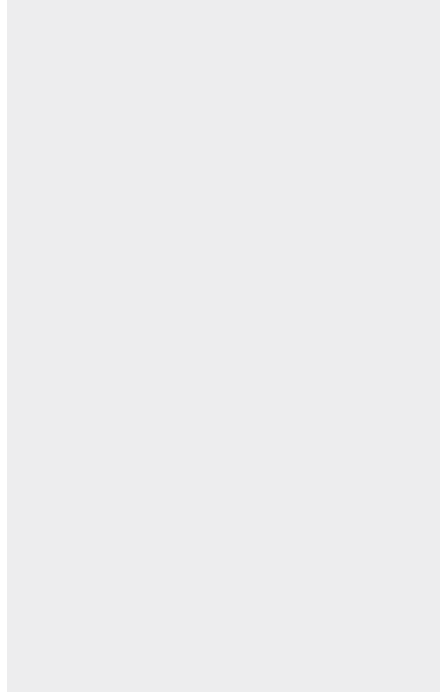
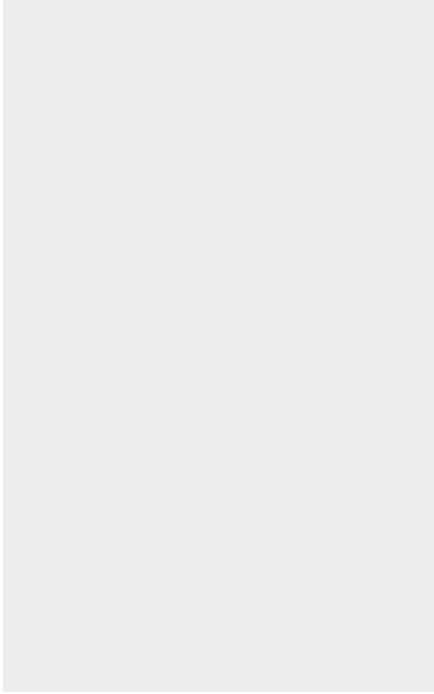
The Metcalf legacy

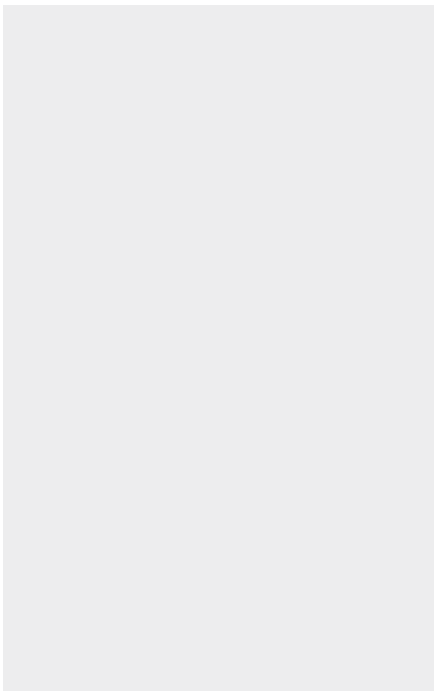
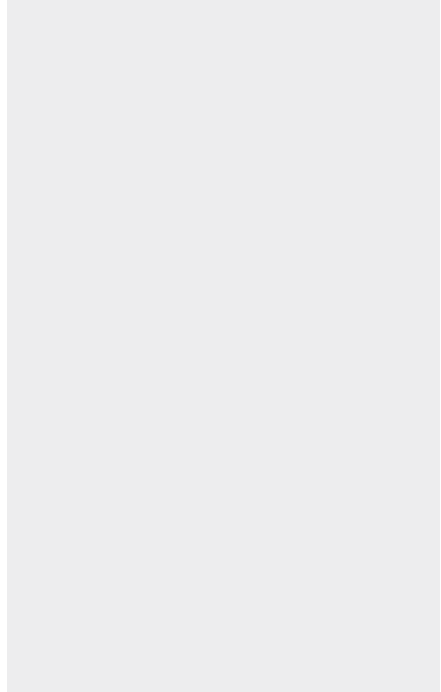
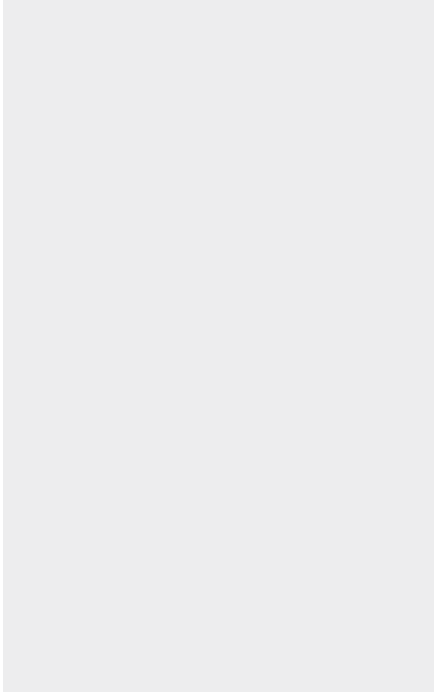
The work of Professor Metcalf's group, of which the Carden Laboratory at the Walter and Eliza Hall Institute of Medical Research is now only one part, remains at the forefront of cancer research. It has given rise to outstanding progress on three fronts.

First, in patient care, an estimated five million patients worldwide have received one or more blood growth regulators or 'colony stimulating factors' (CSFs) as they are widely known, since 1990 when they were licensed for general use. (Their uptake has been strongest in the US, Canada, Europe, Japan and Australia.) Most of the patients have needed CSFs to raise their white cell counts and protect them from potentially lethal infection following radiation therapy, high dose cancer chemotherapy, or a bone marrow transplant. Patients with HIV/AIDS have also had CSFs as part of their treatment.

A second area where the work of the Carden Laboratory has been influential is as the seedbed for research on cancer. It has given rise to a Cancer Research Unit at the Walter and Eliza Hall Institute, the Ludwig Institute for Cancer Research in Melbourne, and the Cooperative Research Centre for Cellular Growth Factors,.

Third, researchers who got their start in the Carden Laboratory have scattered to top cancer laboratories in all corners of the world. The work has generated a new field of medical research that has had a major impact internationally, particularly in the study of the blood and its place in cancer control.





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Afterword

A history is a narrative and interpretation of past occurrences, and we usually speak of events in history. There is a sense in which Don Metcalf's work and achievements are an event or a powerful moment in the history of research funding by the Cancer Council. However, we also often use the word event to describe an organised gathering to celebrate people or occurrences, and the 'Metcalf event' of 26 November 2004, as those involved in the preparation of the celebration called it, was a great moment of a different kind. That afternoon, on the vast front lawn of Government House, the Cancer Council celebrated Don Metcalf's 50 years of cancer research. The majesty of the venue, the bright sunshine, the white marquees, the arrival of the 250 guests who had enthusiastically responded to the invitation to honour the man, all brought grandeur to the occasion. The event received substantial financial support from Amgen, the pharmaceutical company that had commercialised the production of CSFs.

The day began with a private meeting between Professor Metcalf and 50 patients who had been treated with CSFs. It was a moving occasion for all present, not least for the scientist, who is known for combining scientific rigour and strict discipline with selfless devotion to patients. This is what Annie Donaldson, who was the spokeswoman for the patients, had written in the program: 'Professor Don Metcalf saved my life. His discovery of CSFs is the reason I am alive today. Without his tireless research and subsequent discovery, I wouldn't be cancer free today. I have been given the extraordinary opportunity to beat my myeloma, not once but twice, through Professor Metcalf's phenomenal discovery. When Professor Metcalf's 50 years as Carden Fellow is celebrated at Government House, I will have the opportunity to meet him for the first time. There are so many things I would like to say, but they can all be summed up with two words. Thank you.'

The remainder of the guests arrived at midday for the formal part of the reception. The guests included the Governor of Victoria and Mrs Landy, Professor Sir Gustav Nossal, dignitaries from the medical and scientific, political and other fields, supporters of the Cancer Council and representatives of Amgen. The speeches resonated not only with the historical details of Metcalf's successes, but also with deep respect and affection for the man.

The President, Dr Ruth Redpath, later reflected that for her: 'The most satisfying event of 2004 marked the jubilee of an extraordinary research partnership between Professor Don Metcalf and The Cancer Council Victoria. The spirit of gratitude

was overwhelming, both for the work of Professor Metcalf and the life given back to people through his work which the Cancer Council has funded’.

She added that ‘everyone involved in the Cancer Council should take pride in the jubilee, because without the support of donors, volunteers and staff, this outstanding research would not have been possible.’

Apart from Professor Metcalf, the main speaker, Professor Sir Gus Nossal, said about his colleague that: ‘Australia’s most distinguished cancer researcher, the Cancer Council’s Carden Fellow, Professor Don Metcalf, is a major player on the world scene. His discovery of CSFs opened a new chapter in haematology. He is one of the few medical scientists who has seen his discoveries flourish from laboratory bench to the patient’s bedside. As a result, he has been showered with honours from many countries, particularly the United States and the United Kingdom.’

The Honorable Steve Bracks MP, Premier of Victoria, who was unable to attend, sent a personal message in which he declared that: ‘The State of Victoria is known for its pre-eminence in Australian medical research and, as Victorians, we can all take pride in the achievements of one of the country’s most distinguished scientists, whose work has benefited countless cancer patients, not just in our State but around the world.’

Several relatives and descendants of the late George Carden, the bequestor after whom Professor Metcalf’s fellowship was named, were there to hear first-hand about the dividends of his legacy for cancer treatment. After the speeches, his great-niece, famous diva Joan Carden, took the stage to sing the beautiful aria ‘Ah bello a me ritorno’ from Bellini’s opera *Norma*. The guest of honour, a great lover of opera, was visibly delighted. The guests would not have failed to notice in the program a personal greeting from another opera star, in this case a very famous past patient. Internationally renowned tenor José Carreras, who had made a full recovery from acute myeloid leukaemia thanks to CSF treatment, paid this tribute to Don Metcalf: ‘Fifty years of hard work are an example for anyone. In your case, they are filled with inspiration for your colleagues and love for patients. Accomplishments such as yours, so generously offered to you and future generations, rank indeed among the highest contributions to society a person can do.’

Finally, among the most fitting and pleasing ways in which ceremony and symbolism simultaneously captured the moment of glory in November 2005 and the 50-year event of distinguished scholarship was the Governor’s presentation of a bronze medallion to Don Metcalf. This is how its creator, Melbourne sculptor Michael Meszaros, interprets his design: ‘The principal characteristics of Professor Don Metcalf’s fruitful career are his doggedness, his systematic approach, cooperation

and association with fellow researchers and parallel institutions, the length of his research career and the fact that he has always been in control of his own research.

'To symbolise these essentials the design shows a wide band working its way around the medal in an irregular rectangular path. This suggests Professor Metcalf as the principal and continuous force running through all the vagaries of his research. The rectangular path suggests a system but with many twists and turns, steps backward, sideways and ultimately forwards.

'The thinner lines suggest associates who enter at various points, follow his path for a while and leave after making their contribution.

'Professor Metcalf's portrait, the irregular ribbon running the height of the medallion, identifies him as the outstanding human element of the process.'

In his own speech Professor Metcalf summed up his relationship with the Cancer Council in these words:

'The greatest piece of good fortune I've ever had, and I shiver at my good luck even today, is the Carden Fellowship, the most remarkable fellowship in the world, which was for 50 years while most fellowships might be for about five years. This story speaks much to the credit of the Cancer Council.'

Ann Westmore's history of research funding by the Cancer Council traces the growth of this endeavour from its modest beginnings in 1936 to its recognition as a major sponsor of cancer research in the State at the turn of the century. In 2004 she interviewed a number of Professor Metcalf's colleagues, who provided a rare insight into the private side of this exceptional and sometimes inscrutable man, to produce her sensitive yet imposing portrait of the scientist, colleague, humanitarian and family man.

Professor Metcalf's long and successful career demonstrates the Cancer Council Victoria's discerning identification of exceptionally gifted cancer researchers for long-term financial support. It therefore seems fitting that the Cancer Council was triggered by the 'Metcalf event' to aim to create, and raise funds for, another, similar fellowship.

Nicole Prosper MA
Secretary to Council
The Cancer Council Victoria

Appendix

Research Fellowships and Research Grants-in-Aid Funded by The Cancer Council Victoria

1 – 2005

The following pages list all the major Research Fellowships and Research Grants-in-Aid that have been awarded by the Cancer Council, from the time when they were first awarded.

Our earliest investigator driven research funding was made possible with a bequest from G F Carden, which funded Professor Don Metcalf throughout his illustrious career (1954 – present).

The Executive Committee of the Cancer Council approved peer reviewed Grants-in-Aid funding commencing in 1951. The Executive Committee takes advice from the Medical and Scientific Committee in relation to research funding and it is therefore pertinent to mention the Chairs of our Medical and Scientific Committee, who were as follows:

1936 – 1946	P MacCallum
1946 – 1954	J O’Sullivan
1955 – 1966	T E Lowe
1966 – 1977	D B Pearce
1977 – 1985	B W Holloway
1985 – 1988	G A Clunie
1989 – 1990	B G Firkin
1991 – 1998	T J Martin
1998 – 2001	R M Fox
2001 –	M C Berndt

Within this appendix, the Research Grants-in-Aid are listed in chronological order by the year the grant commenced. Typically, grants were awarded for one to three years although some researchers have been successful in obtaining several grants in succession.

Within each year, grants are listed alphabetically by the name of the chief investigator.

Where available, the investigator's research organisation and title of the project is also provided.

Two staff of the Research Management Unit, Josie Italia and Marian Wilson, have conscientiously and enthusiastically carried out the compilation of these listings from Cancer Council archival material. Their hard work and eye for detail is greatly appreciated.

Woody Macpherson
Head, Research Management Unit
The Cancer Council Victoria

Research Fellowships

G F CARDEN CANCER RESEARCH FUND

Established in 1948 with a bequest from George F Carden Melbourne cinema owner (The Adelphi Picture Theatre in North Carlton now known as the San Remo Ballroom.) Mr Carden was also a Melbourne City Councillor.

1954 – present D Metcalf

Studies leading to the discovery, isolation and production of colony stimulating factors (CSFs)

SIR EDWARD DUNLOP CANCER RESEARCH FELLOW

Established in 1994 as a special fund from public donations, to support a research fellowship in honour of our long-term patron and supporter, Sir Edward 'Weary' Dunlop.

1994 – 1998 D L Vaux (Walter and Eliza Hall Institute of Medical Research)
Mechanisms of Cell Death

2002 – 2005 A W Roberts (Royal Melbourne Hospital and Walter and Eliza Hall Institute of Medical Research)
Translational Research in Haematology and Oncology

KATHLEEN & HARRY LOVATT FRASER FELLOWSHIP

Established in 1987 as part of a bequest to support cancer research.

1996 – 1999 C G Begley

Genes and Growth Factors in Human Leukaemia

2000 vacant

2001 – 2006 Peter M Coleman (Walter and Eliza Hall Institute of Medical Research)

Novel Regulators of Apoptosis

W J KILPATRICK FELLOWSHIP

This Fellowship was established in 1962 in recognition of the services of Sir William Kilpatrick in the fight against cancer. Sir William (1906 – 1985) was a financial adviser and fundraiser for the Cancer Council for 30 years. He was also the founding President of the Australian Cancer Society and spent 12 years as Chairman of the International Union Against Cancer (UICC).

1962 – 1967 P E Hughes (Department of Pathology, University of Melbourne)
Aspects of Carcinogenesis

1968 – 1981 J H Colebatch (Royal Children's Hospital)
Therapeutic Trials in Leukaemia

LIONS CANCER RESEARCH FELLOWSHIP

Established in 1977, by the donation of a capital fund from the Victorian Lions Foundation, to support a cancer research laboratory and fellowship.

1980 – 1985 G F Burns (Walter and Eliza Hall Institute of Medical Research)
Immune Response to Cancer — the Significance of Lymphocytes

1985 – 1995 A W Boyd (Walter and Eliza Hall Institute of Medical Research)
Regulation of Normal and Neoplastic B Lymphocytes

1996 – 2001 A Elfanty (Walter and Eliza Hall Institute of Medical Research)
Characterisation of Primitive Blood Cells that Express the SCL Gene

2002 – 2003 vacant

2004 – R Anderson (Walter and Eliza Hall Institute of Medical Research)
Coeliac Disease and Cancer

ARTHUR A THOMAS FELLOW

1962 S Weiner (Department of Pathology)
Chromosome Studies in Retinoblastoma

1963 C Kidson (Baker Research Institute)
Studies of Molecular Genetics of Mammalian Cells in Relation to Carcinogenesis

1971– 1976 C G Hard (Department of Pathology, University of Melbourne; and Baker Research Institute)
Renal Carcinoma

Research Grants-in-Aid

Year of Commencement: 1951

The Therapeutic Efficacy of Radio-Active Substances and Nitrogen Mustard

Dr K Scott (Royal Melbourne and Austin Hospitals)

Co-Investigator: Dr C E Eddy et al.

The Uptake of Radio-Active Iodine, with Particular Reference to Thyroid Carcinoma

Prof V M Trikojus (Department of Biochemistry, The University of Melbourne)

Co-Investigator: Miss M McQuillan et al.

Year of Commencement: 1952

Cancer of the Rectum

Dr J Freidin (Department of Pathology, The University of Melbourne)

Year of Commencement: 1953

Research on Soft Tissue Tumours

Dr J Hurley (Department of Pathology, The University of Melbourne)

Year of Commencement: 1954

An Investigation into the General Features, Histological Characters and Life History of Malignant Tumours of the Kidney

Dr G W Briggs (Department of Pathology, The University of Melbourne)

The Study of Primary Tumours of the Liver, from the Clinical, Pathological and Statistical Points of View

Dr Fleming (Department of Pathology, The University of Melbourne)

Investigation into Blood Chemistry After Uretero-Intestinal Anastomosis

Dr G Godfrey (Department of Clinical Research in Obstetrics & Gynaecology, The University of Melbourne)

Co-Investigator: Dr A M Hill

Research into Biochemical Differences Between Normal and Malignant Cells of Mammary Tumours

Dr R K Morton (Department of Biochemistry, The University of Melbourne)

Co-Investigator: Miss M Branster

Year of Commencement: 1955**The Products Produced by Heat on Foodstuffs**

Prof W Davies (Department of Chemistry, The University of Melbourne)

Co-Investigators: Mr H S Bachelard, Q N Porter, J R Wilmshurst

Muscle Tumours

Dr J Hurley (Department of Pathology, The University of Melbourne)

Tumours of Bone

Dr K W Mills (Department of Pathology, The University of Melbourne)

Year of Commencement: 1956**An Investigation of the Effect of Various Hormonal Stimuli on the Growth of Experimental Tumours**

Dr T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigator: Dr S Rose

The Action of Amino-azo Dyes

Dr P E Hughes (Department of Pathology, The University of Melbourne)

The Relative Affinities of Carcinogenic Dyes for the Proteins of Normal and Malignant Cells

Prof E S J King (Department of Pathology, The University of Melbourne)

Year of Commencement: 1957**The Products Produced by Heat on Foodstuffs**

Prof W Davies (Department of Organic Chemistry, The University of Melbourne)

Co-Investigators: Q N Porter, J R Wilmshurst

Mechanisms of Induction of Cancer of the Liver and Bone by Carcinogenic Agents

Prof E S J King (Department of Pathology, The University of Melbourne)

Co-Investigators: Dr P E Hughes, Dr C J Louis, Mr S Hohlov, Mrs S L Ovenden

Cancer of the Uterus

Prof S L Townsend (Department of Obstetrics & Gynaecology, The University of Melbourne)

Co-Investigators: Dr G Godfrey, Dr B Kneale

Biochemical Differences Between Normal and Malignant Cells

Prof V M Trikojus (Department of Biochemistry, The University of Melbourne)

Co-Investigators: Prof R K Morton, Miss M Branster

The Direct Action of Growth Hormone Rich Extracts on Cancer Tissue Growth

Prof R D Wright (Department of Physiology, The University of Melbourne)

Co-Investigator: Dr T R Bradley

Year of Commencement: 1958**Development of Television Camera to View the Inside of Hollow Viscera**

G Berci (Department of Surgery, The University of Melbourne)

Co-Investigators: J Davids, L Kont

The Continuous Local Infusion of Cancer Tissue; Mammary Gland Metabolism

Dr T R Bradley (Department of Physiology, The University of Melbourne)

The Products Produced by Heat on Foodstuffs

Prof W Davies (Department of Organic Chemistry, The University of Melbourne)

Co-Investigators: B Cowlishaw, Q N Porter, J R Wilmshurst

The Significance of Fluorescein-Globulin Staining

Dr P E Hughes (Department of Pathology, The University of Melbourne)

Implantation of Human Tumours into the Anterior Chamber of the Eye of the Guinea Pig

Mr N Johnson (Department of Surgery, The University of Melbourne)

Fluorescein-Globulin Staining of Tissues

C J Louis (Department of Pathology, The University of Melbourne)

Adrenal Secretion of Steroid Hormones

J R McDonald (Department of Physiology)

Screening of Carcinogens

S L Ovenden (Department of Pathology, The University of Melbourne)

Efforts to Isolate a Cancer Metabolite in Urine

Prof F H Shaw (Department of Pharmacology, The University of Melbourne)

Leukaemia in Childhood

Prof S L Townsend (Department of Obstetrics and Gynaecology, The University of Melbourne)

X-ray Pelvimetry During Pregnancy

Prof S L Townsend (Department of Obstetrics and Gynaecology, The University of Melbourne)

Co-Investigators: C Macdonald, T N Swindon

Investigation into Some Aspects of Primary Lung Cancer

C W E Wilson (Baker Medical Research Institute)

Year of Commencement: 1959**Study of Absorption of Vitamin B12 in Patients with Cancer of the Colon**

E A Allcock (Surgery Department, The University of Melbourne)

Television Project - Endoscopy

Dr G Berci (Surgery Department, The University of Melbourne)

Cellular Index of Sensitivity to Ionizing Radiation

Dr W Chanen (Department of Obstetrics and Gynaecology, The University of Melbourne)

Carcinogenicity of Coal Tars

G S Christie (Department of Pathology,
The University of Melbourne)

Further Biochemical Studies on the Acute Toxic Action of the Liver Carcinogen Dimethylnitrosamine

G S Christie (Department of Pathology,
The University of Melbourne)
Co-Investigators: M J Bailie, R N Le Page

Induction of Congenital Abnormalities in Rats by Antenatal Administration of Dimethylnitrosamine and Heliotrine

G S Christie (Department of Pathology,
The University of Melbourne)
Co-Investigator: B B Stratford

Precancerous Changes in Liver Cells During Carcinogenesis

G S Christie (Department of Pathology,
The University of Melbourne)
Co-Investigator: R N Le Page

A Study of Leukaemia in Children

Dr J H Colebatch (Royal Children's
Hospital)

Radiation Detectors

Dr J T Duncan (Chemistry Department,
The University of Melbourne)

Physiological and Pathological Changes in the Composition of Plasma Proteins

P Edman (St Vincent's School of Medical
Research)

The Mechanism of Anaemia in Leukaemia and Lymphomas

Dr G Hale (Department of Medicine, The
University of Melbourne)

Differential Staining with Fluorescein Egg Albumen

Dr P E Hughes (Department of
Pathology, The University of Melbourne)
Co-Investigator: C J Louis

Humoral Factors in Liver Hyperplasia

Dr P E Hughes (Department of
Pathology, The University of Melbourne)

Canine Tumours

A G Jabara (Department of Pathology,
The University of Melbourne)

Methods of Assessment of Tumour Activity following Heterologous Transplantation

N Johnston (Surgery Department, The
University of Melbourne)

Experimentally Produced Intestinal Tumours

Prof E S J King (Department of
Pathology, The University of Melbourne)
Co-Investigator: G Varasdi

Non-Specificity of Globulins in Fluorescein Staining; Non-Specificity of Serum Proteins and Fluorescein Staining

Prof E S J King (Department of
Pathology, The University of Melbourne)
Co-Investigators: P E Hughes, C J Louis

Fluorescein Globulin Staining of Cancers

C J Louis (Department of Pathology, The
University of Melbourne)

The Radiological Diagnosis of Meningioma of the Brain and Spinal Cord

H A Luke (Alfred Hospital)

**Association of C14 Labelled
Corticosteroids with Plasma Protein
Binding**

Dr I R McDonald (Physiology
Department, The University of
Melbourne)

Co-Investigator: Miss M J Reich

**The Duration of Action of ACTH on
Adrenal Secretion and its Relationship to
Dosage**

Dr I R McDonald (Physiology
Department, The University of
Melbourne)

Co-Investigator: Miss M J Reich

**The Relationship Between Sodium Balance
and Corticosteroid Secretion in Sheep with
Autotransplanted Adrenal Glands**

Dr I R McDonald (Physiology
Department, The University of
Melbourne)

Co-Investigator: Miss M J Reich

Distribution of Nucleic Acids in Cells

D W Menzies (Department of Pathology,
The University of Melbourne)

Co-Investigators: G Varasdi, S L
Ovenden, S Weiner, S Hohlov

**The Study of Gene Action in the Fungus
*Neuro-spora crassa***

J A Pateman (Botany Department, The
University of Melbourne)

Co-Investigator: Mrs E Szego

Pharmacological Investigation into Cancer

Prof F H Shaw (Pharmacology
Department, The University of
Melbourne)

**Some Effects of Whole Body Ionizing
Irradiation on the Cells in the Peripheral
Blood of the Rat**

Dr D O Shiels (Cancer Institute Board)

**Effects of Hormones on Cell Growth and
Dormancy**

K G M Skene (Botany Department, The
University of Melbourne)

Co-Investigator: D J Carr

Carcinoma of the Parathyroid Gland

J D Tange (Department of Pathology, The
University of Melbourne)

**Analysis of the Advantages and
Disadvantages of X-rays to the Abdomen
during Pregnancy**

Prof S L Townsend (Department of
Obstetrics and Gynaecology, The
University of Melbourne)

**Studies in the Antigenicity of
Carcinomatous Tissues**

Dr S Weiner (Prince Henry's Hospital)

Tumours in Marsupials

S Weiner (Department of Pathology, The
University of Melbourne)

Enzymes in Leucocytes

Dr R G Whyllie (Baker Medical Research
Institute)

Carcinoma of Lung

Dr C W E Wilson (Baker Medical
Research Institute)

Year of Commencement: 1960**Television Project**

G Berci (Department of Surgery, The University of Melbourne)

Co-Investigators: J Davids, L Kont, F H Caldwell

The Behaviour of Lymphoid Tumour Cells in Diffusion Chambers

T R Bradley (Department of Physiology, The University of Melbourne)

Effects of Carcinogens on Inorganic Constituents of Cell

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Carcinogenic Action of Dimethylnitrosamine

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Transplantable Experimental Kidney Neoplasm

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Chemotherapy of Malignant Disease in Children

J H Colebatch (Royal Children's Hospital)

Regional Perfusion with Cancer Chemotherapeutic Agents

Mr K R Cox (Department of Surgery, The University of Melbourne)

Tissue Transplantation

Mr K R Cox (Department of Surgery, The University of Melbourne)

Splenectomy in Leukaemia and Allied Disorders

G C de Gruchy (Department of Medicine, The University of Melbourne)

Co-Investigator: R A Williams

Studies with Radioactive Chromium and Iron on the Mechanism of Anaemia in Leukaemia, Lymphoma and Myelosclerosis

G C de Gruchy (Department of Medicine, The University of Melbourne)

Co-Investigator: R A Williams

Testosterone in the Treatment of Anaemia due to Bone Marrow Depression in Leukaemia and Allied Disorders

G C de Gruchy (Department of Medicine, The University of Melbourne)

Co-Investigator: R A Williams

Study of the Secretion and Metabolism of Steroid Hormones of the Adrenal Cortex

D A Denton (Department of Physiology, The University of Melbourne)

Co-Investigators: J R Goding, J A Munro, J P Coghlan, J R Blair-West, R D Wright, M Wintour, H Feld

Development of a Radiation Sensitive for Low Intensities

Dr J T Duncan (Chemistry Department, The University of Melbourne)

A Study of the Changes in the Composition of Plasma Proteins

P Edman (St Vincent's School of Medical Research)

Effect of Carcinogens on Foetal Development

C R Green (Department of Pathology, The University of Melbourne)

Co-Investigator: B B Stratford

Electronmicroscopy (technical)

S Hohlov (Department of Pathology, The University of Melbourne)

Chemical Carcinogenesis

Dr P E Hughes (Department of Pathology, The University of Melbourne)

Fluorescein-Egg Albumen Staining

Dr P E Hughes (Department of Pathology, The University of Melbourne)
Co-Investigator: C J Louis

Humoral Factors in Liver Regeneration

Dr P E Hughes (Department of Pathology, The University of Melbourne)

Canine Ovarian Tumours

A G Jabara (Department of Pathology, The University of Melbourne)

Intestinal Tumours in the Rat

E S J King (Department of Pathology, The University of Melbourne)
Co-Investigator: G Varasdi

Non-Specificity of Serum Proteins in Fluorescein Conjugate Staining

E S J King (Department of Pathology, The University of Melbourne)
Co-Investigators: P E Hughes, C J Louis

Fluorescein-Globulin Staining of Uterine Tissues

C J Louis (Department of Pathology, The University of Melbourne)

Histochemistry of Normal and Tumour Tissues

D W Menzies (Department of Pathology, The University of Melbourne)

A Study of Metabolites in the Urine of Cancer Patients

P J Morgan (Department of Pharmacology, The University of Melbourne)

Screening of Potential Carcinogens

S L Ovenden (Department of Pathology, The University of Melbourne)

Cancer Pathology in Animal Specimens

Dr H B Rudduck (Department of Pathology, The University of Melbourne)

The Pathogenesis of Molluscum Sebaceum

I S Russell (Department of Surgery, The University of Melbourne)

An investigation of the Ehrlich-Hanske-Lettre mouse ascites tumour

E M Trautner (Department of Physiology, The University of Melbourne)
Co-Investigator: D A Coates

Antigenicity of Malignant Tissue

S Weiner (Prince Henry's Hospital)

Biopsy Cannula

S Weiner (Department of Pathology The University of Melbourne)

Enzymes in Leucocytes

R G Wyllie (Baker Medical Research Institute)
Co-Investigators: A D McCutcheon, C Kidson

Electronmicroscopy

N Xeros (Department of Pathology, The University of Melbourne)
Co-Investigator: S Weiner

Year of Commencement: 1961

Television as an Aid to Diagnosis

G Berci (Department of Surgery, The University of Melbourne)

DNA Transformation of Thyroid Tumour in Vivo

R G Bradley (Department of Physiology, The University of Melbourne)

Co-Investigator: S Rose

Fluorescein-Globulin Staining

D A Bremner (Department of Pathology, The University of Melbourne)

Acute Toxic Action of Dimethylnitrosamine on the Liver

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigators: R N Le Page, M J Bailie

Skin Carcinogenesis by Dimethylnitrosamine

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Chemotherapy of Malignant Disease

J H Colebatch (Royal Children's Hospital)

The Isolated Perfusion of Tumour-bearing Areas with Cancer Chemotherapy Agents

Mr K R Cox (Department of Surgery, The University of Melbourne)

The Mechanisms of Anaemia in Lymphomas and Chronic Leukaemia

G C de Gruchy (Department of Medicine, The University of Melbourne)

Detection of Secondary Irradiation Emitted by Water

J F Duncan (Chemistry Department, The University of Melbourne)

Co-Investigator: D M Sitharama-Rao

The Composition of Plasma Proteins in Normal and Pathological Conditions

P Edman (St Vincent's School of Medical Research)

Graft-versus-Host Reactions in Renal Transplantation

R Fowler Jnr (Department of Surgical Research, Royal Children's Hospital)

Tissue Transplantation and Cellular Immunology

R Fowler Jnr (Department of Surgical Research, Royal Children's Hospital)

Co-Investigators: J E Carey, P Johansen

Treatment of Widespread Malignant Disease - Protection against Massive Doses of Cytotoxic Agents by Temporary Splenic Vascular Occlusion

R Fowler Jnr (Department of Surgical Research, Royal Children's Hospital)

Co-Investigators: B Wilson, M Cass

Congenital Abnormalities

C R Green (Department of Pathology, The University of Melbourne)

Co-Investigator: B B Stratford

Examination of Chromosome Patterns in Infants and Children with Developmental Anomalies and Leukaemia;

Mrs J Haylock (Department of Pathology, Royal Children's Hospital)

Chemical Carcinogenesis in Adenomatoid Rat Liver Tumours

Dr P E Hughes (Department of Pathology, The University of Melbourne)

Peritoneal Tumours in the Rat

E S J King (Department of Pathology, The University of Melbourne)

Histochemical Studies

D W Menzies (Department of Pathology, The University of Melbourne)

Cancer in Domestic Animals

Dr H B Rudduck (Department of Pathology, The University of Melbourne)

The Effect of Ischemia and Toxic Agents on Tissue Antigens

S Weiner (Prince Henry's Hospital)

Studies on the Virus of Rabbit Skin Papilloma

D O White (Bacteriology Department, The University of Melbourne)

Cellular Index of Sensitivity to Ionising Radiation

W Chanen (Department of Obstetrics and Gynaecology, The University of Melbourne)

Liver Damage in Acute Helioirone and Dimethylnitrosamine Poisoning

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Chemotherapy of Malignant Disease

J H Colebatch (Royal Children's Hospital)

Co-Investigators: A C L Clark, L I Taft, R N Howard

Study of Leukaemia in Children

J H Colebatch (Royal Children's Hospital)

Co-Investigators: L I Taft, A C L Clark, B M Wilson

Year of Commencement: 1962**Chromosome Replication and Aberrations in Human Cells**

M Blackwood (Botany School, The University of Melbourne)

Co-Investigator: R Angell

Chemical Composition of a Natural Cell-Division Factor

M I Bruce (Botany School, The University of Melbourne)

Co-Investigators: Dr W Bottomley, Dr N P Kefford, J A Zwar

Tumour Cells in Transparent Ear-Chambers

I K Buckley (Department of Pathology, The University of Melbourne)

Development of Techniques for Effective Delivery of Cytotoxic Drugs with Minimal Bone Marrow Depression

Mr K R Cox (Department of Surgery, The University of Melbourne)

Presence of Carcinogens in Fuels and Cooking Oil

W Davies (Department of Organic Chemistry, The University of Melbourne)

Co-Investigator: J R Wilmshurst

Red Cell Glycolytic Metabolism in the Leukaemias and Myelofibrosis

G C de Gruchy (Department of Medicine, The University of Melbourne)

An Investigation of the Action of Adrenal Steroid Hormones

D A Denton (Department of Physiology, The University of Melbourne) Et al

**The Regulation of Aromatic Biosyntheses
- A Model for the Control of Complex
Biosynthetic Pathways**

C H Doy (Department of Bacteriology,
The University of Melbourne)

Co-Investigators: P N Morgan, K D
Brown

**Radiation Chemistry of Water and
Organic Liquids**

J F Duncan (Department of Inorganic
Chemistry, The University of Melbourne)

Co-Investigator: D M Sitharama-Rao

The Role of Borate in Plant Growth

L R Finch (Department of Biochemistry,
The University of Melbourne)

**Effects of Carcinogens on Foetal
Development**

C R Green (Department of Pathology,
The University of Melbourne)

Chromosome Patterns in Children

Mrs J Haylock (Royal Children's
Hospital)

**Hormonally Induced Ovarian Tumours in
Dogs**

A G Jabara (Department of Pathology,
The University of Melbourne)

Spontaneous Tumours of the Dog

A G Jabara (Department of Pathology,
The University of Melbourne)

Metabolic Basis of Human Leukaemia

C Kidson (Baker Medical Research
Institute)

Urinary Gonadotrophin Studies

F I R Martin (Royal Melbourne Hospital)

**The Proteins of Cell Nuclei from Normal
and Malignant Tissues**

C M Mauritzen (Department of
Biochemistry, The University of
Melbourne)

Activity of Carcinogens

S L Ovenden (Department of Pathology,
The University of Melbourne)

Studies on Mammary Carcinoma

I C Parsons (Department of Biochemistry,
Monash University)

Cancer Chemotherapy

D Rabinov (Alfred Hospital)

Co-Investigators: T R Bradley, S Rose

**A Study of the Gibberellin Content of
Developing Mature and Dormant Seeds**

K G M Skene (Botany School, The
University of Melbourne)

**Electronmicroscopic Studies of Normal
and Neoplastic Cells**

S Weiner (Department of Pathology, The
University of Melbourne)

Neutrophil Alkaline Phosphatase

R G Wyllie (Baker Medical Research
Institute)

Control of Cell Multiplication

N Xeros (Department of Pathology, The
University of Melbourne)

Year of Commencement: 1963**Chromosome Studies in the Leukaemias and Lymphomas**

A G Baikie (Department of Medicine, The University of Melbourne)

Co-Investigator: A S D Spiers

Endoscopic Studies

G Berci (Department of Surgery, The University of Melbourne)

Co-Investigator: M Escott

Electron Microscopy in Liver Disease

P S Bhathal (Department of Pathology, The University of Melbourne)

An Investigation of Chromosome Replication and Behaviour

M Blackwood (Botany School, The University of Melbourne)

Co-Investigator: R Angell

Investigation of the Secretion and Action of Adrenal Steroid Hormones

J R Blair-West (Department of Pathology, The University of Melbourne)

Co-Investigators: G W Boyd, J P Coghlan, D A Denton, J R Goding, M Wintour, R D Wright

Continuos Injection Systems, Enzyme Induction, DNA Transformation and Cell Biology

T R Bradley (Department of Pathology, The University of Melbourne)

Co-Investigators: Mrs N Burnstock, Mrs M Jago, J G Nelson, D Rabinov, S Rose, A Traill

Isolation and Characterization of a Plant Cell Division Substance

M I Bruce (CSIRO - Division of Plant Industry, in conjunction with the Botany School, The University of Melbourne)

Co-Investigators: W Bottomley, N P Kefford, J A Zwar

Effects of Cyclophosphamide on Homograft Survival

Miss J E Carey (Department of Surgical Research, Royal Children's Hospital)

Co-Investigator: Dr M Cass

Ontogeny of Immunoglobulins in the Developing Chick

Miss J E Carey (Department of Surgical Research, Royal Children's Hospital)

Steroid Induced Defects of Globulin Synthesis

Miss J E Carey (Department of Surgical Research, Royal Children's Hospital)

Co-Investigator: R Fowler Jnr

The Beta Globulin of Amniotic Fluid

Miss J E Carey (Department of Surgical Research, Royal Children's Hospital)

Pathological and Biochemical Effects of Cytotoxins

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: R N Le Page

Chemotherapy of Malignant Tumours

J H Colebatch (Royal Children's Hospital)

Co-Investigator: A C L Clark

Study of Leukaemia in Children

J H Colebatch (Royal Children's Hospital)

Co-Investigators: A C L Clark, L I Taft,
T Spatt, B M Wilson

Regional Perfusion Studies

Mr K R Cox (Department of Surgery, The
University of Melbourne)

Effect of Carcinogens on Tumours

M Cuning (Department of Pathology,
The University of Melbourne)

Investigation of Rat Liver Regeneration

M Cuning (Department of Pathology,
The University of Melbourne)

Carcinogens in the Domestic Environment

W Davies (Department of Organic
Chemistry, The University of Melbourne)

Co-Investigator: J R Wilmshurst

Miniature Television Camera

J Fleischer (Department of Surgery, The
University of Melbourne)

Comparison of the Physical Properties of Cartilaginous Areas in Canine Mixed Mammary Tumours with Certain Normal Tissues

Dr J V Hurley (Department of Pathology,
The University of Melbourne)

Co-Investigator: A G Jabara

Mechanisms of Photolysis of Amino Acids and Nucleic Acids

R B Johns (Department of Chemistry, The
University of Melbourne)

Co-Investigator: Q N Porter

The Alteration in Dermal Histology in Relation to Age, Exposure and to the Development of Cutaneous Malignancy

D R Marshall (Department of Surgery,
The University of Melbourne)

Determination of Blood Volume and Its Application to Regional Perfusion in Chemotherapy

V C Marshall (Department of Surgery,
The University of Melbourne)

The Endocrine Effects of Pituitary Tumours

F I R Martin (Royal Melbourne Hospital)

Urinary Gonadotrophins

F I R Martin (Royal Melbourne Hospital)

Nucleic Acids in Normal and Tumour Cells

D W Menzies (Department of Pathology,
The University of Melbourne)

Studies of Organ-Specific Antigens

R C Nairn (Department of Pathology,
Monash University)

An Investigation of the Hormonal Control of Breast Cancer

I C Parsons (Department of Biochemistry,
Monash University)

The Pathogenesis of Conjunctival Cancer (In Cattle)

H B Rudduck (Department of Pathology,
The University of Melbourne)

Congenital Abnormalities and Carcinogens

B B Stratford (Department of Pathology,
The University of Melbourne)

Histochemistry of the Reticulo - Endothelial System

R G Wyllie (Baker Medical Research
Institute)

Thymidine Inhibition of Cell Multiplication

N Xeros (Department of Pathology, The
University of Melbourne)

Year of Commencement: 1964

Level of Protein-Bound Carcinogen in Rats Given Anabolic Hormone

S Azarmie (Department of Pathology, The University of Melbourne)

Major Abnormalities of the X-Chromosome in a General Hospital Population

A G Baikie (Department of Medicine, The University of Melbourne)

Co-Investigators: O M Garson, S M Weste

Investigations of Chromosome Replication and Behaviour

M Blackwood (Botany School, The University of Melbourne)

Structure of Human Antibodies

C J Brackenridge (St Vincent's School of Medical Research)

Studies on DNA Induced Transformation, Drug Resistance in Mammalian Cells and Plasma Cell Tumours

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigator: Dr A Shulman

Canine Neoplasms

G S Christie (Department of Pathology, The University of Melbourne)

Co-Investigator: A G Jabara

Study of Leukaemia in Children

J H Colebatch (Royal Children's Hospital)

Co-Investigators: Dr A C L Clark, L I Taft, T Spatt, B M Wilson

An Investigation of the Application of Regional Perfusion and Arterial Infusion Techniques

Mr K R Cox (Department of Surgery, The University of Melbourne)

The Formation of Carcinogens from Heated Cholesterol

W Davies (Department of Organic Chemistry, The University of Melbourne)

Co-Investigator: J R Wilmshurst

Endoscopy

Prof M R Ewing (Department of Surgery, The University of Melbourne)

Co-Investigator: Dr G Berci

Image Storage

Prof M R Ewing (Department of Surgery, The University of Melbourne)

Co-Investigators: Dr G Berci, Mr J Fleischer

Lymphangiography

Dr W S C Hare (Department of Surgery, The University of Melbourne)

Co-Investigator: Mr P T Bruce

The Mechanism of Photolytic Transformation of Amino Acids and of Heterocyclic Ring Systems of Biological Interest

R B Johns (Department of Organic Chemistry, The University of Melbourne)

Co-Investigator: Q N Porter

Proteins of Cell Nuclei from Normal and Malignant Tissues

C M Mauritzen (Department of Biochemistry, The University of Melbourne)

Organ-specific and Cancer-Specific Antigenes

R C Nairn et al. (Department of Pathology, Monash University)

An Investigation of Hormonal Control of Breast Cancer

I C Parsons (Department of Biochemistry, Monash University)

Co-Investigator: Mrs M Malinek

The Effect of Kinetin and Related Cell Division Promoters on the Growth of Plants

K S Rowan (Botany School, The University of Melbourne)

Co-Investigator: J W Anderson

Chemoprophylaxis in the Surgical Treatment of Malignancies in the Large Bowel

S D Rubbo (Department of Bacteriology, The University of Melbourne)

Co-Investigators: E S R Hughes, B Blainey, M Brown, K Hardy, R Mushin, D Paarman, I Russell

Electron Microscopy of Mycetoza

S Weiner (Department of Pathology, The University of Melbourne)

Mode of Action of Nitrogen Mustards

M Whisson (Department of Pathology, The University of Melbourne)

Co-Investigators: Dr A Jeney, Dr G Warwick, Dr T A Connors

Delay in Initiation of Viral Infection

D O White (Department of Bacteriology, The University of Melbourne)

The Virus of Rabbit Oral Papilloma

D O White (Department of Bacteriology, The University of Melbourne)

Cellular Histochemistry

R G Wyllie (Baker Medical Research Institute)

Year of Commencement: 1965

Cellular Glycolysis in Mongolism

A G Baikie (Department of Medicine, The University of Melbourne)

Co-Investigator: G C de Gruchy

Development and Application of Endoscopic Techniques

G Berci (Department of Surgery, The University of Melbourne)

Studies Using Agents Having a Selective Action on the Biliary Tree

P S Bhathal (Department of Pathology, The University of Melbourne)

Investigation of the Secretion and Action of Adrenal Steroid Hormones

J R Blair-West (Department of Physiology, The University of Melbourne)

Co-Investigators: G W Boyd, J P Coghlan, D A Denton, J R Goding, M Wintour, R D Wright, R E Peterson, D Scott

A Comparison of Normal Human Antibodies with Abnormal Proteins

C J Brackenridge (St Vincent's School of Medical Research)

Cell Culture Studies

T R Bradley (Department of Physiology, The University of Melbourne)

The Measurement of Growth Hormone in Human Urine

K J Catt (Department of Medicine, Monash University)

The Use of Internally Labelled Pituitary Hormones to Study Loci of Actions of Rat Growth Hormone and Prolactin

K J Catt (Department of Medicine Monash University)

Chemotherapy of Malignant Tumours

J H Colebatch (Royal Children's Hospital)
Co-Investigators: A C L Clark, M S Rice, H Ekert

Study of Leukaemia in Children

J H Colebatch (Royal Children's Hospital)
Co-Investigators: A C L Clark, L I Taft, T Spatt, M S Rice, L T Lantin, H Ekert

Regional Perfusion and Arterial Infusion of Cytotoxic Drugs in the Treatment of Malignant Disease

Mr K R Cox (Department of Surgery, The University of Melbourne)

Effects of X-irradiation on Cell Specificity

W G R M de Boer (Department of Pathology, Monash University)

Cytochemical Diagnosis of Leukaemia

H Ekert (Royal Children's Hospital)
Co-Investigator: X Dennett

The Mechanism of Photolytic Transformation of Amino Acids and of Heterocycle Ring Systems of Biological Interest

R B Johns (Department of Organic Chemistry, The University of Melbourne)
Co-Investigators: Q N Porter, P Gordon, T Jaskewycz, A P Telford

Cigarette Tar Carcinogenesis

R N Le Page (Department of Pathology, The University of Melbourne)
Co-Investigators: S Thrower, J M Blunck

Electron Microscopy of Acute Heliotrine Poisoning

R N Le Page (Department of Pathology, The University of Melbourne)
Co-Investigator: V L Shotlander

Electron Microscopy of Chronic Liver Poisoning by Pyrrolizidine Alkaloids

R N Le Page (Department of Pathology,)

Macrophage Digestion of Yeast Glucan Particles

R N Le Page (Department of Pathology, The University of Melbourne)
Co-Investigator: G S Christie

The Possible Inhibition of Mitotic Activity by Acute Renal Failure, with Special Reference to Wound Healing

J Nayman (Department of Surgery, Monash University)
Co-Investigator: F T McDermott

Liver Damage as a Result of Acute Heliotrine Poisoning

V L Shotlander (Department of Pathology, The University of Melbourne)
Co-Investigator: R N Le Page

Gene Action in Insect Cytodifferentiation and Morphogenesis

J A Thomson (School of Zoology and Genetics, The University of Melbourne)

Carcinogen-binding Proteins

D O White (Department of Microbiology, The University of Melbourne)

Virus of Rabbit Oral Papilloma

D O White (Department of Microbiology, The University of Melbourne)

Enzyme Systems in Leucocytes in Relation to Neoplasia

R G Wyllie (Baker Medical Research Institute)

Stimulation of Colony Growth Using Leukaemic Serum

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigators: D Metcalf, W Robinson

The Growth of Bone Marrow Cells in Vitro Stimulation of Growth of Mouse Marrow Cells by Feeder Layers

T R Bradley (Department of Physiology, The University of Melbourne)

Year of Commencement: 1966**Investigation of the Biosynthesis, Secretion and Metabolism of Steroid Hormones**

J R Blair-West (Department of Physiology, The University of Melbourne)

Co-Investigators: J P Coghlan, D A Denton, J R Goding, B A Scoggins, M Wintour, R D Wright

Colony Cell Morphology

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigators: D Metcalf, W Robinson

Colony Growth from Polycythaemic and Anaemic Mouse Bone Marrow

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigators: D Metcalf, W Robinson

Colony Growth of Rat Bone Marrow Cells in Vitro

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigator: R Siemenowicz

Preparation and Properties of Growth and Lactogenic Hormones

K J Catt (Department of Medicine, Monash University)

Co-Investigator: B Moffat

Study of Leukaemia in Children

J H Colebatch (Royal Children's Hospital)

Co-Investigators: H Ekert, J A Corrie, L I Taft, T Spatt, M B Horan, M S Rice

Central Nervous System Infiltration

J A Corrie (Haematology Research Clinic, Royal Children's Hospital)

Co-Investigators: M S Rice, R Anderson

Examination of Heated Foodstuffs for Carcinogens

W Davies (Department of Organic Chemistry, The University of Melbourne)

Cell Specificity and Neoplastic Transformation in Tissues Exposed to X-irradiation

W G R M de Boer (Department of Pathology, Monash University)

Immunological Factors in Neoplasia

T Ghose (Department of Pathology, Monash University)

Carcinogenesis and Teratogenesis

C R Green (Department of Pathology,
The University of Melbourne)

**Autoradiographic Study of Renal Failure
Upon Cellular Activity**

J Nayman (Department of Surgery,
Monash University)

Co-Investigator: F T McDermott

The Pathogenesis of Cattle Eye Cancer

H B Rudduck (Department of Pathology,
The University of Melbourne)

**Electron Microscopy of Diachaea
Leucopoda Rost**

S Weiner (Department of Pathology, The
University of Melbourne)

Electron Microscopy of Lymph Nodes

S Weiner (Department of Pathology, The
University of Melbourne)

Year of Commencement: 1967

**Chromosome Studies in the Malignant
Lymphomas and Leukaemias**

A G Baikie (Department of Medicine,
The University of Melbourne)

Co-Investigator: O M Garson

**Studies of the Lymphocytes in Neoplastic
and Normal Lymph Nodes**

A G Baikie (Department of Medicine,
The University of Melbourne, St Vincent's
Hospital)

Co-Investigator: S M Weste

Cigarette Tar Carcinogenesis

J M Blunck (Department of Pathology,
The University of Melbourne)

**Investigation of Levels of Protein Bound
3'-methyl-4-dimethylaminoazobenzene in
Livers of Rats Fed a Diet Containing 2%
Chloramphenicol**

J M Blunck (Department of Pathology,
The University of Melbourne)

**Investigation of the Chemistry of
Aminoazo Dye Binding by Rat Liver
Protein, Using 14C-labelled Methionine**

J M Blunck (Department of Pathology,
The University of Melbourne)

The Growth of Bone Marrow Cells In Vitro

T R Bradley (Department of Physiology,
The University of Melbourne)

Co-Investigator: Mrs M Resson

**Preparation, Structure and Biological
Properties of Growth and Lactogenic
Hormones**

K J Catt (Department of Medicine,
Monash University)

Co-Investigator: B Moffat

Chemotherapy of Malignant Tumours

J H Colebatch (Royal Children's
Hospital)

Co-Investigators: H Ekert, J H
McDonald

Study of Leukaemia in Children

J H Colebatch (Royal Children's
Hospital)

Co-Investigators: H Ekert, J A Corrie, L I
Taft, T Spatt, M B Horan, J H McDonald

**Chromosome Studies in Cancer, and Pre-
Cancerous Lesions of the Uterine Cervix**

M Drake (Victorian Cytology
(Gynaecological) Service, Prince Henry's
Hospital)

Canine Neoplasms

A G Jabara (Department of Pathology,
The University of Melbourne)

Organ-specific and Cancer-Specific Antigenes

R C Nairn (Department of Pathology,
Monash University)

Co-Investigators: W G R M de Boer, T
Ghose, A R McGiven, P N J Ironside, H
A Ward, E F Potworowski

The Histogenesis of Canine Ovarian Tumours Induced by Stilboestrol Administration

J D O'Shea (Department of Pathology,
The University of Melbourne)

Co-Investigator: A G Jabara

An Investigation in the Control of Melanophores: Factors Affecting the Production of Melanomas

B L Reed (Victorian College of
Pharmacy)

Year of Commencement: 1968

Investigation of Secretion and Action of Adrenal Steroid Hormones

J R Blair-West (Department of Physiology,
The University of Melbourne)

Co-Investigators: J P Coghlan, D A
Denton, J W Funder, B A Scoggins, E M
Wintour, R D Wright

Investigations of the Effect of Chloramphenicol on the Carcinogenic Action of 3'-methyl-4-dimethylaminoazobenzene (3'-MeDAB) on Rat Liver

J M Blunck (Department of Pathology,
The University of Melbourne)

Purification, Structural Analysis and Radio-immunoassay of Pituitary and Placental Hormones

K J Catt (Department of Medicine,
Monash University)

Co-Investigator: C Beck

Effects of Helioitrine and Carbon Tetrachloride on Rat Liver

G S Christie (Department of Pathology,
The University of Melbourne)

Co-Investigator: A G Jabara

Chemotherapy of Malignant Tumours

J H Colebatch (Royal Children's
Hospital)

Co-Investigators: J H McDonald, R N
Matthews

Liver Cancer

Mr K R Cox (Department of Surgery)

Cell Specificity and Neoplastic Transformation in Organs and Tissues Exposed to X-irradiation

W G R M de Boer (Department of
Pathology, Monash University)

Chromosome Studies in the Leukaemias and Malignant Lymphomas

O M Garson (Department of Medicine,
The University of Melbourne)

Demonstration of Cancer in the Liver and Pancreas by the Infusion of Particular Contrast Agents into the Hepatic Artery and its Branches

Dr W S C Hare (Department of
Radiology, The University of Melbourne)

Co-Investigators: Mr K R Cox, J T
Andrews

Hormonal Influence on DMBA Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Organ-Specific and Cancer-Specific Antigens

R C Nairn (Department of Pathology, Monash University)

Co-Investigators: W G R M de Boer, T Ghose, A R McGiven, P N J Ironside, H A Ward, M Cerini, J M Rolland

Expression of the Viral Genome in Cells Infected with Oncogenic and Non-Oncogenic Adenoviruses

D O White (Department of Microbiology, The University of Melbourne)

Year of Commencement: 1969

Investigation of the Secretion and Action of Adrenal Steroid Hormones

J R Blair-West (Department of Physiology, The University of Melbourne)

Co-Investigators: J P Coghlan, D A Denton, J W Funder, B A Scoggins, E M Coghlan, R D Wright

Structural and Biological Properties of Human Placental and Pituitary Hormones

K J Catt (Department of Medicine, Monash University)

Co-Investigator: C Beck

Identification, Measurement, Opacification and Treatment of Liver Cancer

Mr K R Cox (Department of Surgery, The University of Melbourne)

Organ Specificity and Neoplastic Transformation in Tissues Exposed to X-Irradiation

W G R M de Boer (Department of Pathology, Monash University)

Chromosome Studies in Human Leukaemia

O M Garson (Department of Medicine, The University of Melbourne)

Hormonal Influences on 9, 10-Dimethyl-1, 2-Benzanthracene (DMBA) Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Mechanism of Action of Progesterone in the Genesis and Enhancement of DMBA Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigator: P H Toyne

Spontaneous Canine Neoplasms

A G Jabara (Department of Pathology, The University of Melbourne)

Biochemical and Morphological Studies of Plasma Membrane Isolated from Liver of Rats Treated with Chemical Carcinogens

R N Le Page (Department of Pathology, The University of Melbourne)

Co-Investigators: P R Dorling, L H Skinner

The Investigation of the Binding of Azo Dyes to Nuclear Proteins in the Early Stages of Carcinogenesis

C M Mauritzen (School of Biochemistry, The University of Melbourne)

Double Isotope Simultaneous Subtraction Cerebral Scanning

J B Morley (Department of Neurology, Monash University)

Leukocyte Antigens in Neoplastic Disease

P J Morris (Department of Surgery, The University of Melbourne)

Organ-Specific and Cancer-Specific Antigens

R C Nairn (Department of Pathology, Monash University)

Co-Investigators: W G R M de Boer, A R McGiven, H K Muller, H A Ward, A E G Tannenberg, J M Rolland, A P P Nind

Co-Investigator: B G Radden

Organ Specificity and Neoplastic Transformation in Tissues Exposed to X-Irradiation or Chemical Carcinogens

M N Cauchi (Department of Pathology, Monash University)

The Effect of Radiotherapy on the Incorporation of Bone Grafts

J E Critchley (Department of Surgery, The University of Melbourne)

Effects of Progesterone on DMBA Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigator: P H Toyne

Hormonal Influences on 7,12-Dimethylbenz(a) Anthracene (DMBA) Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigator: F C Wilson

Mechanism of Action of Progesterone on DMBA Mammary Carcinogens in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: P H Toyne, F C Wilson

Calcitonin Assay in Medullary Carcinoma of the Thyroid

T J Martin (Department of Medicine (Austin Hospital), University of Melbourne)

Co-Investigators: R A Melick, T Reeve

Medullary Carcinoma of the Thyroid

T J Martin (Department of Medicine (Austin Hospital), University of Melbourne)

Year of Commencement: 1970

Secretion and Action of Steroid Hormones

J R Blair-West (Department of Physiology, The University of Melbourne (Howard Florey Laboratories))

Co-Investigators: J P Coghlan, D A Denton, B A Scoggins, E M Wintour, R D Wright

Pituitary and Placental Hormones in Malignant Disease

H G Burger (Department of Medicine, Monash University (Prince Henry's Hospital))

Co-Investigators: K J Catt, W G Straffon, J T Bellair, C Beck

An Investigation into the Role of Tissue Collagenase in the Invasion of Neoplasms

N R Campbell (Department of Dental Medicine and Surgery, The University of Melbourne)

Organ-Specific and Cancer-Specific Antigens

R C Nairn (Department of Pathology, Monash University)

Co-Investigators: E P Guli, M N Cauchi, D J Davies, A R McGiven, H K Muller, H A Ward, A E G Tannenberg, A P P Nind

The Development and Investigation of Microminiature Vascular and Lymphatic Surgery

B McC O'Brien (Department of Surgery, The University of Melbourne)

Year of Commencement: 1971

Investigation of Secretion and Action of the Steroid Hormones

J R Blair-West (Howard Florey Institute of Experimental Physiology and Medicine)

Co-Investigators: J P Coghlan, D A Denton, J F Nelson, B A Scoggins, E M Wintour, R D Wright

Pituitary and Gonadal Hormones in Malignant Disease

H G Burger (Department of Medicine and Medical Research Centre, Monash University)

Co-Investigators: H W G Baker, C Beck, J T Bellair, G C Ennis, B Hudson, W G Straffon

Foetal Antigens in Neoplasia

M N Cauchi (Department of Pathology, Monash University)

Co-Investigator: A E G Tannenberg

Hormonal Influences on DMBA Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: P H Toyne, F C Wilson, L C Minasian

Biochemical and Morphological Studies of Plasma Membranes Isolated from Liver of Rats Treated with Chemical Carcinogens

R N Le Page (Department of Pathology, The University of Melbourne)

Co-Investigators: P R Dorling, P Hertzog, R Yock, L H Skinner

Synthesis of Hormones by Human Tumours in Cell Culture

T J Martin (Department of Medicine, The University of Melbourne)

Leucocyte Antigens in Neoplastic Disease

P J Morris (Department of Surgery, The University of Melbourne)

Co-Investigator: J F Forbes

Immunological Aspects of Cancer

R C Nairn (Department of Pathology, Monash University)

Co-Investigators: E P Guli, A R McGiven, D J Davies, H K Muller, H A Ward, J M Rolland, A P P Nind, G R Flannery

The Development and Investigation of Micro-Miniature Vascular and Lymphatic Surgery

B McC O'Brien (Department of Surgery, The University of Melbourne)

Co-Investigators: N Shanmugan, G H D Miller, R W Blamey, J W Vorrath

Investigation into Enzymes Involved in Pyrimidine and Purine Pathways in Red Cells in Adult Acute Leukaemia

M B van der Weyden (Department of Medicine, Monash University)

Co-Investigator: B G Firkin

Year of Commencement: 1972**Factors Controlling the Growth and Differentiation of Haemopoietic Cells In Vitro**

T R Bradley (Department of Physiology, The University of Melbourne)

Co-Investigators: M A Summer, P Fry

Pituitary and Gonadal Hormones in Malignant Disease

H G Burger (Department of Medicine and Medical Research Centre, Monash University)

Co-Investigators: H W G Baker, C Beck, G C Ennis, B Hudson, W G Straffon

Hormonal Influences on 7, 12-Dimethylbenz(a)-anthracene (DMB) Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: E Boyda, L C Minasian, F C Wilson

Peptide Hormone Synthesis by Endocrine and Non-Endocrine Tumours

T J Martin (Department of Medicine, The University of Melbourne)

Leucocyte Antigens in Neoplastic Disease

P J Morris (Department of Surgery, The University of Melbourne)

Co-Investigators: J F Forbes, J P Madigan

Immunological Aspects of Cancer

R C Nairn (Department of Pathology, Monash University)

Co-Investigators: E P Guli, A R McGiven, D J Davies, H K Muller, H A Ward, J M Rolland, A P P Nind, G R Flannery

The Development and Investigation of Micro-Miniature Vascular and Lymphatic Surgery

B McC O'Brien (Department of Surgery, The University of Melbourne)

Co-Investigators: J W Vorrath, J P Pascoe, B Nicholls, E F O'Sullivan, A M McLeod, D Fonda, T J Baxter

Biochemical, Histological and Immune Studies in Ulcerative Colitis

J McK Watts (Department of Surgery, Monash University)

Co-Investigator: P S Hunt

Year of Commencement: 1973**Pituitary and Gonadal Hormones in Malignant Disease**

H G Burger (Department of Medicine and Medical Research Centre, Monash University)

Co-Investigators: H W G Baker, C Beck, D M de Kretser, B Hudson, W G Straffon

Amino Acid Sequence of an Antigen which Reacts with Lymphocytes from Patients with Cancer

P R Carnegie (School of Biochemistry, The University of Melbourne)

Foetal Antigens in Neoplasia

M N Cauchi (Department of Pathology, Monash University)

Co-Investigator: H A Ward

A Study of Coagulation and Platelet Abnormalities in Malignant Diseases and Myeloproliferative Disorders

B G Firkin (Department of Medicine, Monash University)

Co-Investigator: G N Brodie

Studies in Ulcerative Colitis

P S Hunt (Department of Surgery,
Monash University)

Co-Investigator: J McK Watts

Hormonal Influences on 7, 12-Dimethylbenz(a)-anthracene (DMB) Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology,
The University of Melbourne)

Co-Investigators: H L G Brown, E
Boyd, L C Minasian

Synthesis of Parathyroid Hormone and Other Hypercalcaemic Factors by Tumour Cells

T J Martin (Department of Medicine, The
University of Melbourne)

Immunological Aspects of Cancer

R C Nairn (Department of Pathology,
Monash University)

Co-Investigators: E P Guli, D J Davies,
B H Toh, J M Rolland, A P P Nind, G R
Flannery, J Rumma

Immunological Studies and Immunotherapy in Acute Myeloid Leukaemia

M G Whiteside (Haematology Unit,
Monash University)

Year of Commencement: 1974

Factors Controlling the Growth and Differentiation of Haemopoietic Cells in vitro

T R Bradley (Department of Physiology,
The University of Melbourne)

Co-Investigators: P Fry, M A Sumner, E
McInerney, I Bertoncello

Pituitary and Gonadal Hormones in Malignant Disease with Particular Reference to Prostatic Carcinoma

H G Burger (Department of Medicine
and Medical Research Centre, Monash
University)

Co-Investigators: H W G Baker, D M
de Kretser, B Hudson, G C Rennie, W G
Straffon

Amino Acid Sequence of an Antigen which Reacts with Lymphocytes from Patients with Cancer

P R Carnegie (School of Biochemistry,
The University of Melbourne)

Co-Investigator: S Murray

Foetal Antigens in Neoplasia

M N Cauchi (Department of Pathology
& Immunology, Monash University)

Co-Investigators: H A Ward, B H Toh

Proliferation of Thymus Derived Cells in Response to Cell Surface Antigens

C Cheers (Department of Microbiology,
The University of Melbourne)

Psychosocial Factors Involved in the Onset and Progress of Haematological Malignancies

L Fail (Psychiatric Unit & Special
Haematology Unit)

Co-Investigator: B Donnelly

Regulation of Nucleotide Metabolism in Myeloma and Lymphoma Cells

L R Finch (Russell Grimwade School
of Biochemistry, The University of
Melbourne)

Hormonal Influences on 7, 12-Dimethylbenz(a)-anthracene (DMB) Mammary Carcinogenesis in the Rat

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: H L G Brown, L C Minasian

Immunodiagnosis of Cancer in Children

D G Jose (Royal Children's Hospital Research Foundation)

Co-Investigators: B Taylor, D E O'Keefe

Immunological Aspects of Cancer

R C Nairn (Department of Pathology & Immunology, Monash University)

Co-Investigators: E P Guli, D J Davies, H K Muller, J M Rolland, G R Flannery, A P P Nind, J Rumma, P Chalmers

The Development and Investigation of Micro-Vascular and Lymphatic Surgery in Cancer

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigators: A M MacLeod, W A Morrison, L A Sharzer, P J Sykes, A Gilbert, T J Baxter, H Ishida, T Kubo, A Fujimaki

The Interaction of Daunomycin with DNA from Human Leukaemic Leucocytes

D R Phillips (Biochemistry Department, La Trobe University)

Co-Investigator: P J Gray

Immunotherapy in Leukaemia

M G Whiteside (Haematology & Medical Oncology Unit, Monash University)

Year of Commencement: 1975

Pituitary and Gonadal Hormones in Malignant Disease

H G Burger (Medical Research Centre & Departments of Endocrinology, Urology & Pathology, Prince Henry's Hospital)

Co-Investigators: D M de Kretser, M Drake, B Hudson, G C Rennie, W G Straffon

Development of a Technique for Distinguishing Between Lymphocytes from Patients with Malignant and Non-Malignant Tumours

P R Carnegie (Russell Grimwade School of Biochemistry, The University of Melbourne)

Differential Levels of Physical and Social Functioning in Patients Treated for Haematological Malignance; A Pilot Study

B Donnelly (Special Haematology Unit, The Royal Melbourne Hospital)

Mode of Action of Antimetabolite Drugs: Investigation of Possible Carcinogenetic Mechanisms

Prof R M Fox (Department of Medicine, Monash University)

DMBA and Progesterone Binding

Dr J W Funder (Department of Medicine, Monash University)

Studies on the Regulation of Pyrimidine Nucleotide Biosynthesis in Hepatoma Cells in Tissue Culture

N J Hoogenraad (Department of Biochemistry, La Trobe University)

Immunobiology of Childhood Malignant Tumours with Immunodiagnostic and Immunotherapeutic Applications

D G Jose (Royal Children's Hospital Research Foundation)

Co-Investigators: F C Wilson, D E O'Keefe

Immunological Aspects of Cancer

R C Nairn (Department of Pathology & Immunology, Monash University)

Co-Investigators: E A Pihl, D J Davies, H K Muller, J M Rolland, G R Flannery, A P P Nind, J Rumma, P Chalmers

The Development and Investigation of Micro-vascular and Lymphatic Surgery in Cancer

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigators: G N Threlfall, F S C Browning, A M MacLeod, C S Haw, T Kurata

Gene Expression in Cell Cultures Derived from Normal Rat Liver and from Minimal Deviation Hepatomas

G H Schreiber (Russell Grimwade School of Biochemistry, The University of Melbourne)

Epithelial Cell Proliferation in Intestinal Crypts of Normal and Dimethylhydrazine-Treated Rats and in Dimethylhydrazine Colonic Carcinomata

P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: D H Barkla

Studies in Ulcerative Colitis and Cancer of the Colon

J McK Watts (Department of Surgery, Monash University)

Co-Investigator: P S Hunt

An Investigation into the Value of Immunotherapy in Prolonging Remission in Leukaemia

Dr M G Whiteside (Haematology & Medical Oncology Unit, Monash University)

Year of Commencement: 1976

Cancer of the Breast

J B Brown (Department of Obstetrics & Gynaecology, Royal Women's Hospital)

Co-Investigators: B MacMahon, P Cole, D Trichopoulos, R W Morgan, B Henderson, B Armstrong,

Cancer of the Uterus

J B Brown (Department of Obstetrics & Gynaecology, Royal Women's Hospital)

Co-Investigators: R M Rome, T Mason, C Lavery, D Fortune

Pituitary, Gonadal and Pancreatic Hormones in Malignant Disease

H G Burger (Medical Research Centre & Departments of Endocrinology, Urology & Pathology, Prince Henry's Hospital)

Co-Investigators: A Bankier, D P Cameron, D M de Kretser, M Drake, R Franklin, A C Herington, B Hudson, G C Rennie, W G Straffon

Foetal Antigens in Neoplasia

M N Cauchi (Department of Pathology & Immunology, Monash University)

Co-Investigator: B H Toh

Mode of Action of Antimetabolite Drugs

Prof R M Fox (Department of Medicine, Monash University)

Chromosome Studies in Human Leukaemia

O M Garson (Department of Medicine, The University of Melbourne)

Follow-up of Colo-Rectal Cancer Patients

E S R Hughes (Department of Surgery, Monash University)

7,12-Dimethylbenz(a)anthracene Breast Cancer: Hormonal Influences on Tumour Initiation and Promotion

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: J E Summers, H G Wyer

Immunological Aspects of Cancer

R C Nairn (Department of Pathology & Immunology, Monash University)

Co-Investigators: E A Pihl, H A Ward, J M Rolland, G R Flannery, A P P Nind, P J Chalmers, I M Light

Interaction of Prolactin and Mammary Cell Surface Receptors in Normal and Neoplastic Tissue

H D Niall (Howard Florey Institute of Experimental Physiology and Medicine)

Co-Investigators: G W Tregear, B Borjesson

The Development and Investigation of Micro-Vascular and Microlymphatic Surgery

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigators: P J Hurwitz, L A Chait, W A Morrison, A M MacLeod, E Tan, M J Black, J W May Jnr, `

The Influence of Choline Esters and Biogenic Amines on Cell Proliferation in Colonic Carcinomata in Rats

P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: D H Barkla

Immunotherapy of Acute Myeloblastic Leukaemia

Dr M G Whiteside (Haematology & Medical Oncology Unit, Alfred Hospital)

Year of Commencement: 1977

Malignancy and Childhood Ulcerative Colitis

Dr G L Barnes (Departments of Gastroenterology & Anatomical Pathology, Royal Children's Hospital)

Co-Investigators: Dr P E Campbell, Dr C W Chow

Studies into the Effect of Protein Intake on Pyrimidine Nucleotide Biosyntheses

P Barton (Department of Biochemistry, La Trobe University)

Co-Investigators: N J Hoogenraad, G J Howlett

Endocrinology of Cancers of the Breast, Uterus and Ovaries

J B Brown (Department of Obstetrics & Gynaecology, The University of Melbourne)

Co-Investigators: R M Rome, M A Smith, D Fortune, R J Pepperell, B L G Kneale, B K Armstrong, R Hahnel, J J Campbell, R Bradley

Pituitary and Gonadal Hormones in Malignant Disease

H G Burger (Medical Research Centre & Departments of Endocrinology, Urology & Pathology, Prince Henry's Hospital)

Co-Investigators: D Allen, J Barlow, M Drake, J W Funder, D L Healy, A C Herington, G Medley, J Stockdale, W G Straffon

Regulation of Nucleotide Metabolism in Myeloma and Lymphoma Cells

L R Finch (Department of Biochemistry, The University of Melbourne)

Chromosome Studies in Human Leukaemia and Other Haematological Malignancies

O M Garson (Department of Medicine, The University of Melbourne)

7,12-Dimethylbenz(a)anthracene Breast Cancer: Hormonal Influences on Tumour Initiation and Promotion

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: G N Marks, K G Parker

Immunology of Malignant Disease in Children

Dr D G Jose (Immunology Research Unit, Royal Children's Hospital)

Co-Investigators: Ms F C Wilson, Ms D E O'Keefe

Pharmacokinetics of Anticancer Drugs

W J Louis (Clinical Pharmacology & Therapeutics Unit, The University of Melbourne)

Co-Investigator: F J E Vajda

Twin Registry for Victoria - A Feasibility Study

J D Mathews (Department of Medicine, The University of Melbourne)

The Detection of Ia Antigens and their Relevance to Cancer in Man

I F C McKenzie (Department of Medicine, The University of Melbourne)

Co-Investigators: M S Sandrin, C R Parish

Contractile Proteins in Neoplasia

H K Muller (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: B H Toh

Immunological Aspects of Cancer

R C Nairn (Department of Pathology and Immunology, Monash University)

Co-Investigators: E A Pihl, H A Ward, J M Rolland, G R Flannery, A P P Nind, P J Chalmers, J A Werkmeister, J Ma

An Investigation of the Relationship of Blood Narcotic Levels to the Relief of Pain

J Nayman (Southern Memorial Hospital)

Co-Investigator: A W Linnane

The Development and Application of Microlymphatic and Microneurovascular Surgery to Cancer

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigators: M J Black, I Fogdestam, W A Morrison, M D Brennan, J W May Jnr, L A Chait, J Hurley

The Regulation Between Rates of Growth and Albumin Synthesis in Minimal Deviation Hepatoma

G H Schreiber (Russell Grimwade School of Biochemistry, The University of Melbourne)

Pharmacokinetics of High Methotrexate Therapy; An Aid to Treatment

J Shaw (Department of Medicine, The University of Melbourne)

Co-Investigators: J R Sullivan, R Bell

Cell Proliferation in Colonic Carcinomata

P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: D H Barkla

Role of Purine Metabolism in Lymphocyte Proliferation

M B van der Weyden (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: L Bailey

Year of Commencement: 1978

A Search for Mutagenic DNA Polymerase in Leukemia

R Ananthakrishnan (Department of Genetics, The University of Melbourne)

Co-Investigator: B T O Lee

Hormonal Studies in Cancers of the Breast, Ovary and Endometrium with Special Reference to Oestrogens

J B Brown (Department of Obstetrics & Gynaecology, The University of Melbourne, Royal Women's Hospital)

Co-Investigator: R J Pepperell

Pituitary and Gonadal Hormones in Breast Cancer and Other Neoplastic Disorders

H G Burger (Medical Research Centre, Prince Henry's Hospital)

Co-Investigators: M Drake, D Allen, G Medley, A Herington, W G Straffon, J W Funder, D L Healy, J Stockdale, P Pearce

Pyrimidine Metabolism in Neoplasia

P H Ellims (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: M B van der Weyden

Chromosome Studies in Human Leukaemia

O M Garson (Department of Medicine, The University of Melbourne)

7,12-Deimethylbenz (a) Anthracene Breast Cancer: Hormonal Influences on Tumour Initiation and Promotion

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: L R Cutbush, G N Marks, K G Parker

Pharmacokinetics of Anti-Cancer Drugs

W J Louis (Clinical Pharmacology & Therapeutics Unit, The University of Melbourne, Austin Hospital)

Co-Investigators: F J E Vajda, N Christophidis, I Lucas, G Francis, A Proudfoot

Prostaglandins in the Pathogenesis of Malignant Hypercalcaemia and of Metastatic Bone Cancer

T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Victorian Twin Registry

J D Mathews (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: J R Temperley

The Detection of Ia Antigens and their Relevance to Cancer in Man

I F C McKenzie (Clinical Pharmacology & Therapeutics Unit, The University of Melbourne, Austin Hospital)

Co-Investigators: M S Sandrin, H Vaughan, C R Parish

Immunological Aspects of Cancer

R C Nairn (Department of Pathology & Immunology, Monash University)

Co-Investigators: E A Pihl, H A Ward, J M Rolland, P J Chalmers & A P P Nind

The Development and Application of Microlymphatic and Microneurovascular Surgery to Cancer

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigators: B Shafiroff, J Franklin, W A Morrison, E Powers, P Donski, A M MacLeod, G Nightingale, I Fogdestam, D De La Pava, R C Wray

The Metabolism of Transferrin and a1-Antitrypsin in Morris Hepatoma 5123TC

G H Schreiber (Department of Biochemistry, The University of Melbourne)

Pharmacokinetics of High Dose Methotrexate Therapy: An Aid to Treatment

J Shaw (Department of Clinical Pharmacology and Therapeutics, The University of Melbourne)

Co-Investigators: J R Sullivan, J J Marty

HLA Genetics, HSV-2 Immunity and Cervical Cancer

M J Simons (Victorian Cytology (Gynaecological) Service, Prince Henry's Hospital)

Co-Investigators: M Drake, N J Gelai, G Medley, D E Allen, C Sinfield, K MacRae

Role of Hypertransfusion in Acute Leukaemia

I R G Toogood (Department of Clinical Haematology & Oncology, The University of Melbourne, Royal Children's Hospital)

Co-Investigator: H Ekert

Chromosome Studies in Human Leukaemia

P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: D H Barkla

Cytosine Arabinoside Transplant in Acute Myeloid Leukaemia of Man

J S Wiley (Department of Medicine, The University of Melbourne, Austin Hospital)

Co-Investigator: A Bui

Year of Commencement: 1979

Pituitary and Gonadal Hormones in Breast Cancer and Other Neoplastic Disorders

D Allen (Medical Research Centre, Prince Henry's Hospital)

Co-Investigators: H G Burger, M Drake, J W Funder, D L Healy, A Herington, G Medley, P Pearce, J Stockdale, W G Straffon

Development of B16 Melanoma Model in C57 BL Mice

Prof G J A Clunie (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Regulation of Intracellular Nucleotide Contents and Differential Sensitivity to Cancer Chemotherapeutic Agents

L R Finch (Department of Biochemistry, The University of Melbourne)

Co-Investigator: A Mitchell

Glucocorticoid Effects on Lymphocytes

Dr J W Funder (Medical Research Centre, Monash University, Prince Henry's Hospital)

Co-Investigator: Dr B A K Khalid

Hormonal Influences on Experimental Breast Carcinogenesis

A G Jabara (Department of Pathology, The University of Melbourne)

Co-Investigators: L R Cutbush, G N Marks, K G Parker

Victorian Twin Registry

J D Mathews (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Phenotypic Characterisation of Human Leukaemias and Lymphomas

I F C McKenzie (Department of Medicine, The University of Melbourne, Austin Hospital)

Co-Investigator: R K Woodruff

The Detection of Ia Antigens and their Relevance to Cancer in Man

I F C McKenzie (Department of Medicine, The University of Melbourne, Austin Hospital)

Co-Investigators: M S Sandrin, C R Parish

Cytoskeletal Proteins in Neoplasia

H K Muller (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: B H Toh

The Role of Nutritional Support During Intensive Chemotherapy in: Remission Induction in Acute Leukaemia and Small Cell Carcinoma of the Lung

D G Penington (Department of Medicine, The University of Melbourne, St Vincent's Hospital)

Co-Investigators: R D Snyder, D Panelli

Evaluation of an End-to-End Stapling Instrument (EEA)

A L Polglase (Department of Surgery, Monash University, Alfred Hospital)

Co-Investigator: E S R Hughes

Factors Affecting the Pharmacokinetics of Cytotoxic Drugs

J Shaw (Department of Clinical Pharmacology and Therapeutics, Royal Melbourne Hospital)

Co-Investigators: J R Sullivan, P W Trembath, J J Marty, T H Hurley

HLA Genetics, HSV-2 Immunity and Cervical Cancer

M J Simons (Victorian Cytology (Gynaecological) Service, Prince Henry's Hospital)

Co-Investigators: M Drake, S Edwards, K MacRae, G Medley, S Nelson

Studies on the Early Detection of Colorectal Cancer

Dr D J B St John (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr F A Macrae

Hormonal Control of Tumours of the Gastrointestinal Tract and Lung

P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: D H Barkla

Provera in the Primary Treatment of Endometrial Carcinoma

P E Weir (Department of Obstetrics & Gynaecology, The University of Melbourne, Mercy Maternity Hospital)

Co-Investigators: D A Abell, N A Beischer

Cytosine Arabinoside Transplant in Acute Myeloid Leukaemia of Man

J S Wiley (Department of Haematology, The University of Melbourne, Austin Hospital)

Co-Investigators: S Jones, W H Sawyer

Year of Commencement: 1980

Effects of Tumour Promoting Agents on Nucleocytoplasmic Transport of RNA Species

J M Blunck (Division of Biological and Health Sciences, Deakin University)

Pituitary and Gonadal Hormones in Breast Cancer and Other Neoplastic Disorders

H G Burger (Medical Research Centre, Prince Henry's Hospital)

Co-Investigators: A C Herington, W G Straffon, J W Funder, D L Healy, J Stockdale, P Pearce

Anthracycline Synthesis

Prof D W Cameron (Department of Organic Chemistry, The University of Melbourne)

Co-Investigator: Dr G I Feutrill

Cryopreservation of Bone Marrow Cells

W M Ellis (Department of Clinical Haematology & Oncology, The University of Melbourne, Royal Children's Hospital)

Co-Investigators: H Ekert, K D Waters, G P Tauro

Genetic Analysis of High Risk Breast Cancer Families

Dr J F Forbes (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Prof G J A Clunie

Factors Influencing Survival in Colo-Rectal Cancer

E S R Hughes (Department of Surgery, Monash University, Alfred Hospital)

Co-Investigators: F T McDermott, E A Pihl

Progesterone Inhibition of Experimental Breast Carcinogenesis

Dr A G Jabara et al. (Department of Pathology, The University of Melbourne)

Studies of Drug Sensitivities and Cellular Proliferation in Human B Cell Neoplasias

I Jack (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: M B van der Weyden

Neurophysins and Lung Cancer

C I Johnston (Department of Medicine, Monash University, Prince Henry's Hospital)

Immunological Characteristics and Monitoring in Childhood Acute Lymphocytic Leukaemia

G T Lee (Department of Clinical Haematology & Oncology, The University of Melbourne, Royal Children's Hospital)

Co-Investigator: H Ekert

Inappropriate Mucin Production in Neoplasia, Dysplasia and Metaplasia. Detection by Immunofluorescence and Radio-Immunoassay

J Ma (Department of Laboratory Medicine, Royal Southern Memorial Hospital)

Co-Investigators: W G R M de Boer, J Nayman

Mechanisms of Invasion and Erosion of Bone in Cancer

Prof T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Detection of Ia Antigens and their Relevance to Cancer in Man

I F C McKenzie (Department of Medicine, The University of Melbourne, Austin Hospital, then moved to Department of Pathology, The University of Melbourne)

The Production of Monoclonal Antibodies to Antigens of Human Tumours, Leukaemias and Lymphomas

Prof I F C McKenzie (Department of Medicine, The University of Melbourne, Austin Hospital)

Cytoskeletal Proteins in Tumour Invasion

H K Muller (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: B H Toh

Cost Effective Comparison of Staple Anastomoses Created by the American End to End Anastomosis Stapling Instrument and the Russian Model 249 Staple Gun

A L Polglase (Department of Surgery, Monash University, Alfred Hospital)

Co-Investigator: E S R Hughes

HLA Genetics, HSV-2 Immunity and Cervical Cancer

M J Simons (Victorian Cytology (Gynaecological) Service, Prince Henry's Hospital)

Co-Investigator: M Drake

Studies on the Early Detection of Colorectal Cancer

Dr D J B St John (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigators: Dr F A Macrae, Mr P Caligiore

Cytosine Arabinoside Transplant in Acute Myeloid Leukaemia of Man

J S Wiley (Department of Haematology, The University of Melbourne, Austin Hospital)

Co-Investigator: W H Sawyer

Year of Commencement: 1981

Effects of Tumour Promoting Agents on Nucleocytoplasmic Transfer of RNA Species

J M Blunck (Division of Biological and Health Sciences, Deakin University)

Co-Investigators: N C Frisch, J Norman

Hormonal Studies in Cancers of the Breast, Ovary and Endometrium with Special Reference to Oestrogens

J B Brown (Department of Obstetrics & Gynaecology, The University of Melbourne, Royal Women's Hospital)

Co-Investigators: R J Pepperell, M A Quinn, R M Rome

Cryopreservation of Bone Marrow Cells

W M Ellis (Department of Clinical Haematology & Oncology, Royal Children's Hospital)

Co-Investigator: H Ekert

Genetics of High Risk Breast Cancer Families

Dr J F Forbes (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigators: Prof G J A Clunie, R Thomson

Proliferative Characteristics of Human Malignant Lymphomas

Dr T E Gan (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: Clin A/Prof M B van der Weyden

Chromosome Studies in Human Leukaemia

Dr O M Garson (Department of Medicine, The University of Melbourne)

Development of In Vitro Cell Lines in Human B Cell Proliferative Disorders

I Jack (Department of Pathology, Royal Children's Hospital)

Co-Investigator: M B van der Weyden

Ectopic Hormone Production in Neoplasia

C I Johnston (Department of Medicine, Monash University, Prince Henry's Hospital)

Co-Investigator: M Newman

Glucocorticoid Effects on Lymphocytes

B A K Khalid (Medical Research Centre, Prince Henry's Hospital)

Co-Investigator: J W Funder

Mechanism of Action of the Interferons at the Cellular and Molecular Level

A W Linnane (Department of Biochemistry, Monash University)

Mechanisms of Cancer Growth in Bone

T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

The Production of Monoclonal Antibodies to Antigens of Human Tumours, Leukaemias and Lymphomas

Prof I F C McKenzie (Research Centre for Cancer and Transplantation, Department of Pathology, The University of Melbourne)

Microlymphatic Surgery in Canine Obstructive Lymphoedema

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigator: D L Lawlor

The Role of Nutritional Support During Remission Induction in Acute Leukaemia

D G Penington (Department of Medicine, The University of Melbourne, St Vincent's Hospital)

Co-Investigator: D Panelli

The Influence of Epidermal Growth Factor on the Initiation and Promotion of Chemically Induced Neoplasia

Prof P C Reade (Department of Dental Medicine & Surgery, The University of Melbourne)

Co-Investigator: Dr N E Steidler

Assessment of Breast Patterns on Xerography in Relation to the Incidence of Breast Cancer in Victoria

N Sacharias (Department of Diagnostic Radiology, Alfred Hospital)

Hypercoagulation in Malignancy

H H Salem (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: B G Firkin

Year of Commencement: 1982

Internal Radiotherapy for Hepatic Metastases

Prof R C Bennett (Department of Surgery, The University of Melbourne, St Vincent's Hospital)

Co-Investigators: K Stribley, B N Gray

Investigation into Cancer Related Problems in General Practice

N E Carson (Community Practice Teaching Unit, Monash University)

Co-Investigator: A T Rose

1,25-(OH)₂D₃ Effect on Malignant Melanoma and Colonic Carcinoma Cells in Culture

Dr J A Eisman (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Role of Immunoregulatory Mechanisms in Maintenance of Remission in Adult Acute Non-Lymphoblastic Leukaemia

Dr F C Firkin (Department of Medicine, The University of Melbourne, St Vincent's Hospital)

Glucocorticoids and Lymphocytes

Dr J W Funder (Medical Research Centre, Prince Henry's Hospital)

Risk Factors in Colorectal Cancer

Prof Sir E S R Hughes (Department of Surgery, Monash University, Alfred Hospital)

Co-Investigators: A/Prof F T McDermott, Mr W R Johnson, Mr B J Milne

A Study of Hereditary and Environmental Factors in the Development of Colorectal Cancer in Metropolitan Melbourne

G A Kune (Department of Surgery, The University of Melbourne, Repatriation General Hospital)

Lectin Binding Affinities of Human Breast Tumours

C J Louis (Department of Pathology, The University of Melbourne, Austin Hospital)

The Targeting of Cytotoxic Agents to Human Lymphocytes, Breast Carcinoma, Melanoma and Colon Carcinoma by Monoclonal Antibodies

Prof I F C McKenzie (Research Centre for Cancer and Transplantation, Department of Pathology, The University of Melbourne)

Co-Investigator: Dr J R Zalberg

Immunological Diagnosis and Prognosis of Cancer

R C Nairn (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: E A Pihl

Canine Obstructive Lymphoedema

B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigator: W A Morrison

Xerographic Breast Patterns and Their Relationship to the Incidence of Breast Cancer

N Sacharias (Department of Radiology, Alfred Hospital)

Relationship Between Foetal Secretion and Neoplastic Expression of Gut Hormones

Dr A Shulkes (Department of Surgery, The University of Melbourne, Austin Hospital)

Co-Investigator: Mr D R Fletcher

Ribosomal RNA Genes in Chromosomes of Leukaemia Cells

D R Smyth (Department of Genetics, Monash University)

Studies on the Early Detection of Colorectal Cancer

Dr D J B St John (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Mr P Caligiore

Growth and Differentiation of Brain Tumours

B H Toh (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: J S Pedersen

Cytosine Arabinoside Transport in Acute Myeloid Leukaemia of Man

J S Wiley (Department of Haematology, Austin Hospital)

Co-Investigators: J Taupin, W H Sawyer

Year of Commencement: 1983

Hormonal Control of Tumours of the Gastrointestinal Tract and Lung

Dr D H Barkla (Department of Anatomy, Monash University)

Co-Investigator: Dr P J M Tutton

Computerised Patient Education and Patient Recall

N E Carson (Department of Community Medicine, Monash University)

Cancer in the Liver by the Use of Radioactive Beads

M Chamberlin (Department of Surgery, The University of Melbourne, St Vincent's Hospital)

Co-Investigators: B N Gray, R C Bennett

Effect of 1,25-Dihydroxyvitamin D₃ on Malignant Melanoma and Colonic Carcinoma in Culture

Dr J A Eisman (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Growth Regulation in the Monocyte-Macrophage Lineage

Dr J A Hamilton (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Design and Synthesis of Sequence Selective DNA Binding Compounds

Dr D P Kelly (Department of Organic Chemistry, The University of Melbourne)

Co-Investigators: Dr L P G Wakelin, Dr R F Martin

Tyrosine Specific Protein Kinases in Neoplastic Cells

Dr B E Kemp (Howard Florey Institute of Experimental Physiology & Medicine then moved to Department of Medicine, The University of Melbourne)

Breast Cancer Growth and Metastasis: Effects of Hormones and Drugs

Prof T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Langerhans' Cells, Skin Cancer and Renal Transplantation

H K Muller (Department of Pathology & Immunology, Monash University)

**Microlymphatic Surgery in Cancer
Obstructive Lymphoedema**

B McC O'Brien (Microsurgery Research
Unit, St Vincent's Hospital)

Co-Investigator: J J Pribaz

**A Temporal Histobiochemical Study
of Some Aspects of Experimental Oral
Carcinoma**

Prof P C Reade (Department of Dental
Medicine & Surgery, The University of
Melbourne)

Co-Investigator: Dr N E Steidler

**Bis-Intercalating Derivatives of
Adriamycin**

Dr J A Reiss (Department of Organic
Chemistry, La Trobe University)

Co-Investigators: Dr D R Phillips, Dr R
T C Brownlee

**In Vitro Modification of Human Bone
Marrow for Transplantation**

Dr D M Robertson (Department of
Immunology, Royal Children's Hospital)

Co-Investigator: Dr C S Hosking

**Studies on the Early Detection of
Colorectal Cancer**

Dr D J B St John (Department of
Medicine, The University of Melbourne,
Royal Melbourne Hospital)

Co-Investigators: Dr F A Macrae, Mr P
Caligiore

**Cytosine Arabinoside Transport in Acute
Myeloid Leukaemia of Man**

J S Wiley (Department of Haematology,
Austin Hospital)

Co-Investigators: J Taupin, R K
Woodruff, W H Sawyer

Year of Commencement: 1984

**Bone Marrow Transplant Enteritis and the
Role of Micro-organisms**

Dr G L Barnes (Department of
Gastroenterology, Royal Children's
Hospital)

Co-Investigator: Dr R Bishop

**Intrahepatic Administration of
Radioactive Yttrium - 90 Microspheres for
the Treatment of Hepatic Metastases**

Prof R C Bennett (Department of Surgery
The University of Melbourne, St Vincent's
Hospital)

Co-Investigators: Dr G Self, Mr B N
Gray

**Growth Factors in Haemopoietic
Organisation**

Dr T R Bradley (Biological Research
Unit, Peter MacCallum Cancer Institute)

Co-Investigator: Dr A B Kriegler

**New Platinum Complex, Anti Tumour
Agents**

Dr G B Deacon (Department of
Chemistry, Monash University)

Co-Investigators: Dr I A G Roos, Dr L P
G Wakelin

**Effect of 1,25-Dihydroxyvitamin D₃ and
Metabolites on the Growth of Human
Malignant Melanoma Cells In Vivo**

Dr J A Eisman (Department of
Medicine, The University of Melbourne,
Repatriation General Hospital)

**Clinicopathologic Relevance of Thymidine
Kinase Activity in Human Breast Cancer**

Dr D H Ellims (Department of Medical
Oncology, Prince Henry's Hospital)

The Aetiological and Therapeutic Relevance of Chromosome Studies in Human Leukaemia and Lymphoma

Dr O M Garson (Department of Medicine, The University of Melbourne)

Prospective Clinico-Pathological Study of Colorectal Cancer at Alfred Hospital

Prof Sir E S R Hughes (Department of Surgery, Monash University, Alfred Hospital)

Co-Investigators: A/Prof F T McDermott, Mr W J Johnson, Mr B J Milne

A Prospective Study of Non-Melanotic Skin Cancer in Victoria

Dr R Marks (Department of Medicine, Monash University, Alfred Hospital)

Co-Investigator: Dr T S Selwood

Effects of Hormones and Drugs

Prof T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

DNA Restriction Enzyme Polymorphisms of Immunoglobulin Genes in Cancer

Dr J D Mathews (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigators: Dr V Lennon, Dr S Whittingham, I Turnbull, B Winthrope

Alloimmunisation to Platelet Transfusions in Leukaemia and Lymphoma

Dr K M McGrath (Red Cross Blood Bank)

Co-Investigators: Dr J F Bishop, Dr M M Wolf

Cellular Immunity to Cancer Studied by Fluorescent Probes

Prof R C Nairn (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigators: Prof E A Pihl, Dr J M Rolland, Dr A P P Nind

Microvascular Lymph Node Transplantation to Restore Lymphatic Function

Mr B McC O'Brien (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigator: Mr J J Pribaz

Tumour Cell Differentiation, Modulation and the Cytoskeleton

Dr J S Pedersen (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: Clin A/Prof B H Toh

Targeting of Anti-Cancer Drugs to Tumours Using Monoclonal Antibodies

Dr G A Pietersz (Department of Pathology, The University of Melbourne)

Co-Investigators: Dr M J Leyden, Prof I F C McKenzie

Studies on the Early Detection of Colorectal Cancer

Dr D J B St John (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigators: Dr F A Macrae, Mr P Caligiore, Miss M Potocnik

The Use of Polymethine Dye Fluorescence to Probe Cell Membrane Rigidity

Dr P Thistlethwaite (Department of Physical Chemistry, The University of Melbourne)

The Production of Monoclonal Anti-Tumour Antibodies for Clinical Use in Man

Dr C H Thompson (Department of Pathology, The University of Melbourne)

Co-Investigators: Prof I F C McKenzie, Dr M J Leyden

Proliferative Characteristics of Human Lymphoid Diseases

A/Prof M B van der Weyden (Department of Medicine, Monash University, Alfred Hospital)

Cytosine Arabinoside Transport and Membrane Fluidity in Acute Leukaemia of Man

Dr J S Wiley (Department of Haematology, Austin Hospital)

Co-Investigators: Dr W H Sawyer, G P Jamieson, R K Woodruff

Amines and Peptides in Anorexia Cachexia

Dr G L Willis (Department of Psychological Medicine, Monash University)

Co-Investigator: Dr G N Brodie

DNA Modification in Altered Gene Control and Carcinogenesis

Dr M D Woodcock (Haematology Research Unit, Peter MacCallum Cancer Institute)

Year of Commencement: 1985

Recombinant DNA Analysis of Lymphocyte Differentiation Factors Produced by Lymphoid Stromal Cells in Normal and Neoplastic States

Dr R L Boyd (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: Dr H A Ward

Effect of Inhibitors of Pyrimidine Biosynthesis Upon Mouse Leukaemia Cells Growing in Culture

Dr R I Christopherson (Russell Grimwade School of Biochemistry, The University of Melbourne)

Immunodiagnosis of Gynaecological Malignancies Using Monoclonal Antibody OM-1

Dr T A de Kretser (Immunogenetics Research Unit, Peter MacCallum Cancer Institute)

Co-Investigator: Dr D G Jose

Control of the Differentiation in Human Myeloid Leukaemic Cells

Dr J A Hamilton (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Development of In Vitro Cell Lines in Human B Cell Proliferative Disorders

Mr I Jack (Department of Microbiology, Royal Children's Hospital)

Biochemistry of Epidermal Growth Factor Receptors in Malignant Cells

Dr B E Kemp (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Multicentre Clinical Trial to Prevent Large Bowel Adenomas: Melbourne Arm

Dr F A Macrae (Department of Medicine & Gastroenterology, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr J R Lambert

Isolation of Factor Responsible for Humoral Hypercalcaemia of Malignancy

Prof T J Martin (Department of Medicine, The University of Melbourne, Repatriation General Hospital)

Selective Targeting of Cytotoxic Drugs to Tumours Using Monoclonal Antibodies

Dr G A Pietersz (Department of Pathology, The University of Melbourne)

Co-Investigators: Dr M J Leyden, Prof I F C McKenzie

Immune Response to Tumour-Associated Substances for the Diagnosis and Monitoring of Cancer

Dr J M Rolland (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Regulation of Ribosomal RNA Gene Activity in Chronic Granulocytic Leukaemia Cells

Dr D R Smyth (Department of Genetics, Monash University)

Studies on the Early Detection of Colorectal Cancer

Dr D J B St John (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr F A Macrae

A Temporal Histobiochemical Study of Some Aspects of Experimental Oral Carcinoma

Dr N E Steidler (Department of Dental Medicine & Surgery, The University of Melbourne)

Co-Investigator: Prof P C Reade

The role of Platelets in Tumour Metastases

Dr P J Thurlow (Department of Haematology, Austin Hospital)

Co-Investigator: Dr C J Louis

The Influence of Hormones on Tumours of the Gastrointestinal Tract and Lungs

Dr P J M Tutton (Department of Anatomy, Monash University)

Co-Investigator: Dr D H Barkla

Methionine Metabolism in Leukaemia

Prof M B van der Weyden (Department of Medicine, Monash University, Alfred Hospital)

The Role of Specific Cell Surface Antigens in T-Cell Cytolysis

Dr I D Walker (Department of Pathology, The University of Melbourne)

Co-Investigators: B J Murray, L Kirszbaum

Cytosine Arabinoside Transport and Membrane Fluidity in Acute Leukaemia of Man

Dr J S Wiley (Department of Haematology, Austin Hospital)

Co-Investigator: Dr W H Sawyer

Colonic Cell Differentiation: Relationship to Colonic Carcinoma

Dr G P Young (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Year of Commencement: 1986

Analysis of Human V ErB-B Related Proteins

Dr T A de Kretser (Immunogenetics Research Unit, Peter MacCallum Cancer Institute)

New Platinum and Palladium Complex Anti-Tumour Agents

Dr G B Deacon (Department of Chemistry, Monash University)

Co-Investigators: Dr I A G Roos, Dr L P G Wakelin

The Relationship Between Blood Transfusion and Tumour Growth

Dr D M A Francis (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigators: Mr R T Judson, Prof G J A Clunie

Mechanisms for Modification of Human Acute Leukaemic Cell Behaviour

Dr O M Garson (Department Medicine, The University of Melbourne)

Co-Investigator: Dr F C Firkin

Photochemical Properties of Porphyrin Derivatives for use in Phototherapy of Tumours

Dr K P Ghiggino (Department of Physical Chemistry, University of Melbourne)

Membrane Proteins of Human Plasma Cells

Prof J W Goding (Department of Pathology, Monash University, Alfred Hospital)

Oncogenes, Inositol Lipids and Cell Proliferation

Dr J A Hamilton (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Isolation of Progenitor Cells of Megakaryocytes from Mouse Bone Marrow - Analysis of their Properties and Studies of their Differentiation In Vitro

Dr R A Harris (Department of Haematology/Oncology, Royal Melbourne Hospital)

To Investigate the use of Photoirradiation Therapy for the Treatment of Cerebral Glioma

Dr A H Kaye (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Design and Synthesis of Sequence Selective DNA Binding Compounds

Dr D P Kelly (Department of Organic Chemistry, University of Melbourne)

Co-Investigators: Dr R F Martin, Dr L P G Wakelin

Biological Activity and Interaction with DNA of Agents Containing a Diamine Coordinated PtCl₂ Moiety Linked to Acridines

Dr W D McFadyen (Department of Experimental Chemotherapy, Peter MacCallum Cancer Institute)

Co-Investigator: Dr L P G Wakelin

Microsurgical Transfer of Omentum in the Treatment of Obstructive Lymphoedema

Mr J J Pribaz (Microsurgery Research Unit, St Vincent's Hospital)

Co-Investigator: Mr W A Morrison

DNA Damage Produced by Radiation

Dr I R Radford (Biological Research Unit, Peter MacCallum Cancer Institute)

Pharmacophore Approach to DNA-Specific Anti-Cancer Drugs

Dr J A Reiss (Department of Chemistry, La Trobe University)

Co-Investigators: Dr D R Phillips, Dr R T C Brownlee

Use of Magnetite-Containing Particles for In Vitro Modification of Bone Marrow Prior to Transplantation

Dr D M Robertson (Department of Immunology, Royal Children's Hospital)

Co-Investigator: Dr C S Hosking

Tumour Cell Differentiation, Modulation and the Cytoskeleton

A/Prof B H Toh (Department of Pathology & Immunology, Monash University, Alfred Hospital)

Co-Investigator: Dr G Toncich

The Role of Specific Cell Surface Antigens in T-Cell Cytolysis

Dr I D Walker (Department of Pathology, The University of Melbourne)

Characterization of Megakaryocyte Potentiator: Its Relationship to Thrombopoietin

Dr N T Williams (Department of Physiology, University of Melbourne)

The Part Played by Smoking in the Imaginative Lives of Young Children: Production of a Preventive Program for Primary Schools

Dr B S Bradley (Department of Psychology, University of Melbourne)

Effects of Cisplatin on Blood and Tumour Glutathione: Correlations with Toxicity and Efficacy

Prof N Christophidis (Department of Medicine, University of Melbourne, Repatriation General Hospital, then moved to Department of Medicine, Caulfield Hospital)

Co-Investigator: Dr J R Zalcborg

Determination of the Amino Acid Sequence of the Human V-ERB-B-Related Apud-1 Protein

Dr T A de Kretser (Laboratory Research Division, Peter MacCallum Cancer Institute)

The Role of HuLy-m5 and Related Retrovirus Sequences in Human Tumourigenesis

Dr N J Deacon (Department of Pathology, University of Melbourne)

To Investigate Papillomavirus Carriage and its Role in Skin Cancer in Immunosuppressed Patients

Dr D J Dyll-Smith (Department of Dermatology, Royal Melbourne Hospital)

Co-Investigator: Dr G A Varigos

Mechanisms for Modification of Human Acute Leukaemic Cell Behaviour

Dr F C Firkin (Department of Medicine, University of Melbourne)

Co-Investigator: Dr O M Garson

Year of Commencement: 1987

Phase I and II Evaluation of New Anticancer Drugs including Carboplatin

Dr J F Bishop (Cancer Medicine, Peter MacCallum Cancer Institute)

Co-Investigator: Dr I N Olver

The Aetiological and Therapeutic Relevance of Chromosome Abnormalities in Malignancy

Dr O M Garson (Department of Medicine, University of Melbourne)

Membrane Proteins of Human Plasma Cells

Prof J W Goding (Department of Pathology, Monash University, Alfred Hospital)

Co-Investigator: Dr M Buckley

The Accuracy of Diagnosing Carcinoma of the Breast by Xeromography at the Royal Melbourne Hospital

Prof W S C Hare (Department of Radiology, University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr C F Tudball

The Role of Insulin-Like Growth Factors in Breast Cancer

Dr A C Herington (Medical Research Centre, Prince Henry's Hospital)

Co-Investigator: Dr J W Funder

Epidermal Growth Factor Receptor: Function and Regulation

Dr B E Kemp (Department of Medicine, University of Melbourne, Repatriation General Hospital)

Synergistic Growth Factors and Haemopoietic Organisation

Dr A B Kriegler (Biological Research Unit, Peter MacCallum Cancer Institute)

Co-Investigator: Dr T R Bradley

Synthesis of DNA-Specific Anti-Cancer Drugs

Dr J A Reiss (Department of Chemistry, La Trobe University)

Co-Investigators: Dr D R Phillips, Dr R T C Brownlee

Screening for Colorectal Cancer: Assessment of Family History as a Marker of Risk

Dr D J B St John (Department of Gastroenterology, University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr F A Macrae

Screening for Colorectal Cancer: Evaluation of New Biochemical Approaches for Detection of Faecal Haem and Haemoglobin

Dr D J B St John (Department of Gastroenterology, Royal Melbourne Hospital)

Co-Investigator: Dr G P Young

The Gastrin Receptor, the Cyto-Skeleton and Gastrointestinal Neoplasm

Clin A/Prof B H Toh (Department of Pathology and Immunology, Monash University, Alfred Hospital)

Structure and Function of Ly-3 in Man and Mouse

Dr I D Walker (Department of Veterinary Sciences, University of Melbourne)

Human Megakaryocyte Development

Dr N T Williams (Department of Physiology, University of Melbourne)

Expression of Brush Border Enzymes in Colonic Epithelium: Relationship to Cancer, Precancer States and Intraluminal Butyrate

Dr G P Young (Department of Medicine, University of Melbourne, Royal Melbourne Hospital)

Year of Commencement: 1988**Transition Metal-Mediated Syntheses of Colchicine-like Antimitotic Agents**

Dr M G Banwell (Department of Organic Chemistry, University of Melbourne)

Co-Investigator: Dr G T Crisp

Analysis of Thymic Stromal Elements in Normal and Neoplastic States

Dr R L Boyd (Department of Pathology and Immunology, Alfred Hospital)

Co-Investigator: Dr H A Ward

Anthracycline Synthesis

Prof D W Cameron (Department of Chemistry, University of Melbourne)

Role of Poly (ADP-Ribose) and NAD Metabolism in Cytotoxic Drug Sensitivity

Prof R M Fox (Haematology & Medical Oncology, Royal Melbourne Hospital)

Co-Investigator: Prof B Hillcoat

Oxygen Radicals as a Mechanism of Doxorubicin Cardiomyopathy and Cytotoxicity

Dr M Green (Department of Medical Oncology, Royal Melbourne Hospital)

Identification of Fibrosis Promoting Growth Factors in Human Leukaemia and Myeloproliferative Disease

Dr E H Januszewicz (Department of Medicine, St Vincent's Hospital, then moved to Department of Haematology, Peter MacCallum Cancer Institute)

An Autocrine Role for Insulin-Like Growth Factor-II in Human Tumour Cell Proliferation

Dr H A Jonas (Department of Medicine, Royal Melbourne Hospital)

The use of Porphyrins as Photosensitizers for the Treatment of Cerebral Glioma

Dr A H Kaye (Department of Surgery, Royal Melbourne Hospital)

Mutant Human Interferons in Topical Treatment of Cancer

Prof A W Linnane (Molecular Biology and Medicine, Peter MacCallum Cancer Institute)

Co-Investigator: Dr I R MacKay

The Potential of Gadolinium-157 Labelled DNA Ligand as Sensitisers in Neutron-Therapy of Cancer

Dr R F Martin (Chemotherapy and Biological Research Units, Peter MacCallum Cancer Institute)

Co-Investigator: Dr B J Allen

Pap Smear Screening and Cancer of the Cervix in Women of Victoria

Dr H A Mitchell (Victorian Cytology (Gynaecological) Service, Prince Henry's Hospital)

Development of a Murine Model Based on Gastric Distension to Study the Emetic and Antiemetic Potential of Drugs

Dr I N Olver (Cancer Medicine, Peter MacCallum Cancer Institute)

Co-Investigator: Dr I A G Roos

Studies of High Dose Prochlorperazine as an Antiemetic for Cancer Chemotherapy Induced Emesis

Dr I N Olver (Cancer Medicine, Peter MacCallum Cancer Institute)

Co-Investigator: Dr J F Bishop

Epithelial-Mesenchymal Interactions in Experimental Oral Cancer

Miss A M Rich (Department of Dental Medicine and Surgery, Melbourne University)

Co-Investigator: Prof P C Reade

The Use of Photodynamic Therapy to Treat Malignant Ascites

Dr R J S Thomas (Department of Surgery, Royal Melbourne Hospital)

The Study of Platelet Activation by Malignant Tumours

Dr P J Thurlow (Department of Haematology, Austin Hospital)

Co-Investigator: Dr J M Connellan

Antitumour Activity and Interaction with DNA of Agents Containing an Amine Co-ordinated Pt Containing Moiety Linked to Intercalators

Dr L P G Wakelin (Chemotherapy and Biological Research Units, Peter MacCallum Cancer Institute)

Co-Investigators: Dr W D McFadyen, Dr P F Alewood, Dr G Wickham

Cytosine Arabinoside Transport and Metabolism in Acute Leukaemias and Lymphomas of Man

Dr J S Wiley (Department of Haematology, Austin Hospital)

Co-Investigator: Dr L R Finch

Colonic Epithelial Cell Differentiation and Cancer: Influence of Dietary Fibre and its Fermentation Products

Dr G P Young (Department of Medicine, Royal Melbourne Hospital)

New Platinum and Palladium Complex Anti-Tumour Agents

Dr G B Deacon (Department of Chemistry, Monash University)

Co-Investigators: Prof B L Hillcoat, Dr L K Webster

Identification and Analysis of New Papillomavirus Type(s) Associated with Human Skin Cancers

Dr D J Dyall-Smith (Department of Dermatology, University of Melbourne)

Co-Investigator: Dr M L Dyall-Smith

Mononuclear Cells - a Source of Growth Factors for Normal Colonic and Malignant Epithelial Cells

Dr P R Gibson (Department of Medicine, Royal Melbourne Hospital)

Membrane Proteins of Plasma Cells and Myeloma

Prof J W Goding (Department of Pathology and Immunology, Monash Medical Centre)

Co-Investigator: Dr M Buckley

A Co-twin Control Study of the Effect of Tobacco Use on Bone Mass in Women

Dr J L Hopper (Department of Medicine, Royal Melbourne Hospital)

Co-Investigator: Dr E Seeman

Regulation of the Tumour Promoter Target - Protein Kinase C

Dr B E Kemp (St Vincent's Institute of Medical Research)

Co-Investigator: Mr C M House

Isolation of Factor Responsible for Humoral Hypercalcaemia of Malignancy

Prof T J Martin (St Vincent's Institute of Medical Research)

Year of Commencement: 1989

Transition Metal-Mediated Syntheses of Colchicine-like Antimitotic Agents

Dr M G Banwell (School of Chemistry, The University of Melbourne)

Effects of Tumour Necrosis Factor and Platelet Activating Factor on Tumour Microvasculature

Dr P E O'Brien (Department of Surgery, Monash University)

Critical DNA Target Size Model of Radiation Action: Tests of its Hypotheses

Dr I R Radford (Biological Research Unit, Peter MacCallum Cancer Institute)

Chromosomes in Identified Cells: A New Technique Applied to Leukaemia

Dr C Rudduck (Department of Medicine, St Vincent's Hospital)
Co-Investigator: Prof O M Garson

Haemopoietic Growth Factors and Peripheral Stem Cell Collection

Dr W P Sheridan (Haematology and Medical Oncology, Royal Melbourne Hospital)
Co-Investigator: Prof R M Fox

The Study of Tumour Derived Platelet Proaggregant Factor

Dr P J Thurlow (Department of Haematology, Austin Hospital)
Co-Investigator: Dr J M Connellan

Drug Resistance in Adult Acute Leukaemia

Prof M B van der Weyden (Department of Haematology, Alfred Hospital)
Co-Investigator: Ms J Brasch

Antitumour Activity and Interaction with DNA of Agents Containing an Amine Co-ordinated Pt Containing Moiety Linked to Intercalators

Dr L P G Wakelin (Chemotherapy & Biological Research Units, Peter MacCallum Cancer Institute)
Co-Investigator: Dr W D McFadyen

Molecular Cloning and Genetic Mapping of a Cell Surface Antigen Associated with T Lymphocyte Mitogenesis

Dr I D Walker (Veterinary Preclinical Sciences, University of Melbourne)

Thrombopoietin Levels in Plasma

Dr N T Williams (Department of Physiology, University of Melbourne)
Co-Investigator: Dr F C Firkin

Role of cAMP-Dependent Protein Kinase in Signal Transduction in Tumour Cell Lines

Dr J D Zajac (Department of Medicine, Royal Melbourne Hospital)

Year of Commencement: 1990

The Role of Heat Shock Proteins in Thermal Protection During Clinical Hyperthermia

Dr R L Anderson (Cell Biology Unit, Peter MacCallum Cancer Institute)

The Role of a Novel Human Stem Cell Leukaemia Gene in Haematopoiesis

Dr C G Begley (Department of Diagnostic Haematology, Royal Melbourne Hospital)
Co-Investigator: Dr K M McGrath

Thymic Stromal Cell - T Cell Interactions in the Development of T Cell Leukaemia

Dr R L Boyd (Department of Pathology and Immunology, Monash Medical Centre, Alfred Hospital)

Regulator Genes for Differentiation of T Lymphoid Tumours

Dr W D Cook (Department of Surgery, Royal Melbourne Hospital)

Effects of Biological Agents in Leukaemia

Dr F C Firkin (Department of Medicine, St Vincent's Hospital)

Regulation of M₁ Subunit of Ribo-nucleotide Reductase in the G₁ Cell Cycle Block in Human Cancer

Prof R M Fox (Department of Haematology and Medical Oncology, Royal Melbourne Hospital)

Chromosomal Localization of Cell Surface Markers and Their Role in Malignancy

Dr O M Garson (Department of Cytogenetics, St Vincent's Hospital)

Co-Investigators: Dr L Webber, Mrs E Dietsch

Assessment of Pharmacological Therapies for Smoking Cessation

Dr S G Gourlay (Department of Social and Preventive Medicine, Monash University)

Co-Investigator: Prof J J McNeil

Steroid Control of Gene Expression in Human Mammary Carcinoma Cells

Dr J A Hamilton (Department of Medicine, Royal Melbourne Hospital)

Co-Investigator: Dr U Novak

Serum Inhibin and Ovarian Cancer

Dr D L Healy (Department of Obstetrics and Gynaecology, Monash Medical Centre)

Co-Investigator: Prof H G Burger

Mechanisms of Transport and Sub-Cellular Location of Photosensitizers in Brain Tumours

Dr A H Kaye (Department of Surgery, Royal Melbourne Hospital)

Co-Investigator: Dr J S Hill

Synergising Growth Factors and Haemopoietic Organisation

Dr A B Kriegler (Cell Biology Group, Peter MacCallum Cancer Institute)

Co-Investigator: Dr I Bertonecello

Human Interferon Analogs: Anti-Tumour Effects

Prof A W Linnane (Molecular Biology and Medicine, Monash University)

Co-Investigator: Dr I R MacKay

Significance of PTH-related Protein in Cancer: Antibodies in Plasma Assay, Tissue Diagnosis and Treatment

Prof T J Martin (St Vincent's Institute of Medical Research)

Co-Investigator: Dr J A Hayman

New Radiomodifiers: Molecular Analysis at the Nucleotide Level in Intact Cells

Dr V Murray (Molecular Sciences Group, Peter MacCallum Cancer Institute)

Co-Investigator: Dr R F Martin

The Mechanism of Action of Vitamin A and cAMP in the Inhibition of Growth of Osteogenic Sarcoma Cells

Dr K W Ng (Department of Medicine, St Vincent's Hospital)

Co-Investigator: Dr D M Findlay

Mechanism of Action of Cyclosporin A in Modulating the Multidrug-resistant Phenotype

Dr J R Zalcborg (Department of Medicine, Repatriation General Hospital)

Co-Investigator: Dr M A DeLuise

Year of Commencement: 1991

Regulation of Growth and Differentiation of Normal and Neoplastic Lympho-Haemopoietic Cells

Dr A W Boyd (Walter & Eliza Hall Institute)

Molecular Characterisation of Chromosome 9 Abnormalities in Lung Cancer

Dr L J Campbell (Department of Cytogenetics, St Vincent's Hospital)
Co-Investigators: Dr M T Gillespie, Prof O M Garson

New Platinum and Palladium Complex Anti-Tumour Agents

Dr G B Deacon (Department of Chemistry, Monash University)
Co-Investigator: Dr L K Webster

Studies on Murine LYN, a Member of the SRC Family of Protein Tyrosine Kinases

Dr A R Dunn (Department of Molecular Biology, Ludwig Institute for Cancer Research)

Chromosomal Localization of Cell Surface Markers and Their Role in Malignancy

Dr O M Garson (Department of Cytogenetics, St Vincent's Hospital)

Protein Kinases and Tyrosine Phosphatases that Control Cell Growth

Dr B E Kemp (St Vincent's Institute of Medical Research)
Co-Investigator: Dr C M House

157GD and 10B-Labelled DNA Ligands as Enhancers for Neutron Radiotherapy

Dr R F Martin (Molecular Sciences Group, Peter MacCallum Cancer Institute)

Co-Investigators: Dr D P Kelly, Dr K Narayan

New Radiomodifiers: Molecular Analysis at the Nucleotide Level in Intact Cells

Dr R F Martin (Chemotherapy Biological Research Unit, Peter MacCallum Cancer Institute)

Co-Investigator: Ms J Thursi

The Identification of the Authentic Laminin Receptor

Dr V Nurcombe (Department of Anatomy, The University of Melbourne)

A Transgenic Mouse Model of Glial Cell Neoplasia

Dr J M Orian (Department of Surgery, Melbourne University)

Co-Investigators: Dr A H Kaye, Dr M F Gonzales

In Vitro Transcriptional Analysis of the Mechanism of Formation and Structure of Apparent Covalent Adriamycin-DNA Adducts

Dr D R Phillips (Department of Biochemistry, La Trobe University)

Angiogenic Stimuli for Pregnant Mammary Gland and Breast Cancer Cell Lines

Dr S J Quirk (Prince Henry's Institute of Medical Research)

Prophylactic Cranial Irradiation in Childhood. Acute Lymphoblastic Leukaemia: Neuropsychological and Educational Implications

Dr E Smibert (Department of Haematology/Oncology, Royal Melbourne Hospital)

Co-Investigators: Ms V Anderson, Dr H Ekert

Genetic Predisposition to Human Colon Cancer

Dr D J B St John (Department of Gastroenterology, Royal Melbourne Hospital)

Co-Investigators: Prof W F Doe, Prof SW Serjeantson

Genetic Engineering of Chimeric and Small Anti-Tumor Antibodies

Dr V R Sutton (Austin Research Institute)

Co-Investigator: Prof I F C McKenzie

Biological and Chemical Transformation of New Platinum Anticancer Agents

Dr L K Webster (Experimental Chemotherapy Laboratory, Peter MacCallum Cancer Institute)

Co-Investigators: Dr P A Tregloan, Dr G B Deacon, Dr J I Sachinidis

Establishment of a Mouse Model for Colon Cancer

Dr A F Wilks (Growth Regulation Laboratory, Ludwig Institute for Cancer Research)

Co-Investigator: Dr R H Whitehead

The Role of Interleukin-3 Megakaryocytopoiesis and Platelet Production

Dr N T Williams (Department of Physiology, Melbourne University)

Does Butyrate Production in the Large Bowel Protect Against Bowel Cancer?

Prof G P Young (Department of Medicine, Melbourne University, Royal Melbourne Hospital)

Year of Commencement: 1992

Regulatory Factors Controlling Insulin-like Growth Factor-II Gene Expression

Prof F Beck (Development Biology Section, Howard Florey Institute)

Co-Investigator: Dr P V Senior

Membrane Proteins of Plasma Cells and Myeloma

Prof J W Goding (Department of Pathology, Monash Medical School, Alfred Hospital)

Repression of the Urokinase Gene in Tumour Cells. Role of Glucocorticoids and the RB-1 Tumour Suppressor Gene

Dr J A Hamilton (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr U Novak

Studies on the Differentiation - Induction of Neural-Derived Paediatric Tumours

Dr G Kannourakis (Haematology & Oncology Research, Royal Children's Hospital)

Photodynamic Therapy for the Infiltrative Low Grade Glioma

Prof A H Kaye (Department of Surgery, Royal Melbourne Hospital)

Co-Investigator: Dr J S Hill

Designing Molecules to Modulate the Action of Oncogenic RAS

Dr H Maruta (Epithelial Biochemistry Laboratory, Ludwig Institute for Cancer Research)

Co-Investigator: Dr A W Burgess

The Regulation of Cell Growth by Intracellular Messenger Molecules

Dr C A Mitchell (Department of Medicine, Monash Medical School, Box Hill Hospital)

Co-Investigator: Dr P I Bird

Inhibition of Colon Tumours by a Prostaglandin Synthesis Inhibitor

Prof P E O'Brien (Department of Surgery, Alfred Hospital)

Co-Investigator: Dr F J Andrews

Characterisation of a Motility Factor Secreted by Tumour Cell Lines

Prof R W Parish (Department of Botany, La Trobe University)

Co-Investigator: Dr S F Li

Relationship of Ionizing Radiation-Induced DNA Damage to Cell Death

Dr I R Radford (Molecular Science Group, then Department of Cell Biology; Peter MacCallum Cancer Institute)

Role of Myb in Carcinogenesis of the Colonic Epithelium

Dr R G Ramsay (Department of Molecular Biology, Ludwig Institute for Cancer Research)

Co-Investigator: Dr R H Whitehead

Isolation and Characterisation of NH-1.1 cDNA (a Candidate Molecule for the NR Receptor)

Dr M S Sandrin (Molecular Immunogenetics Laboratory, Austin Research Institute)

G-CSF-Mobilised PBSC Support for High-Dose Chemotherapy of Breast Cancer

Dr W P Sheridan (Department of Medical Oncology, Royal Melbourne Hospital)

Co-Investigators: Dr C G Begley, Prof R M Fox, Dr K M McGrath

Transport of Nucleoside Drugs in Acute Leukaemia and Other Tumours

Dr J S Wiley (Department of Haematology, Austin Hospital)

Co-Investigators: Dr G P Jamieson, Dr W H Sawyer

Year of Commencement: 1993

Animal Models of the HLH Transcription Factors in Haemopoietic Development

Dr C G Begley (Cancer Research Unit, Walter & Eliza Hall Institute of Medical Research)

The Role of Mouse Son of Sevenless 1 and 2 in the Regulation of RAS Activity

Dr D D L Bowtell (Howard Florey Institute until 30 September 1994; then Peter MacCallum Cancer Institute from 1 October 1994)

Normal and Cancerous Development of Blood Stem Cells

Dr A W Boyd (Lions Clinical Research Laboratory, Walter & Eliza Hall Institute of Medical Research)

Search for Tumour Suppressor Genes on Chromosome 9p in Lung Cancer

Dr L J Campbell (Department of Cytogenetics, St Vincent's Hospital)

Co-Investigator: Dr L B Irving

Phenotypic and Genotypic Identification of Marrow Cells Post-Transplant

Prof O M Garson (Department of Cytogenetics, St Vincent's Hospital)

Co-Investigator: Dr C Rudduck

**Novel DNA Binding Radiomodifiers:
Molecular Evaluation in Intact Cells**

Dr R F Martin (Molecular Sciences
Group, Peter MacCallum Cancer
Institute)

**Parathyroid Hormone-Related Protein in
Skeletal Metastases of Breast and Prostate
Cancer**

Prof T J Martin (St Vincent's Institute of
Medical Research)
Co-Investigators: Dr J M Moseley, Dr V
Grill, Dr J A Danks

**The Mechanism of Inhibition of
Experimental Colon Tumours by Sulindac**

Prof P E O'Brien (Department of Surgery,
Alfred Hospital)
Co-Investigator: Dr F J Andrews

**A Transgenic Mouse Model of Glial Cell
Neoplasia**

Dr J M Orian (Department of Surgery,
The University of Melbourne)
Co-Investigator: Prof A H Kaye

**Adriamycin-Induced DNA Interstrand
Crosslinks: a Molecular Biology Analysis
of the Mechanism, Structure and Stability**

Dr D R Phillips (Department of
Biochemistry, La Trobe University)

**G-CSF-Mobilised PBSC Support for
High-Dose Chemotherapy of Breast
Cancer**

Dr W P Sheridan (Department of
Medical Oncology, Royal Melbourne
Hospital)
Co-Investigators: Dr C G Begley, Prof R
M Fox, Dr A Grigg

**Improving Targeting in Tumour
Immunotherapy**

Dr M J Smyth (Cellular Cytotoxicity
Laboratory, Austin Research Institute)

Co-Investigator: Dr J A Trapani

**Role of Lipid Mediators in Adverse
Reactions to G- and GM-CSF**

Dr A G Stewart (Microsurgery Research
Centre, St Vincent's Hospital)

**Autoantibodies as Reagents to Conserved
Components of the Dividing Cell**

Prof B H Toh (Department of Pathology
& Immunology, Monash Medical School)
Co-Investigator: Dr I Van Driel

Colon Cancer and the DCC Gene

Dr A F Wilks (Growth Regulation
Laboratory, Ludwig Institute for Cancer
Research)
Co-Investigators: Dr H M Cooper, Dr R
H Whitehead

**Local Effects of PTH Related Peptide on
Growth of Tumour Cells**

Dr J D Zajac (Department of Medicine,
The University of Melbourne)

**Genetic Basis of Resistance to
Chemotherapy Drugs**

Dr J R Zalcborg (Department of
Oncology, Repatriation General
Hospital)
Co-Investigators: Dr J D Parkin, Dr A F
Cowman

Year of Commencement: 1994

**Expression of Heat Shock Proteins in
Tumour Cells**

Dr R L Anderson (Department of Cell
Biology, Peter MacCallum Cancer
Institute)

**Mouse Studies of Bone Marrow Cancer
(Isolation of Blood Production Inhibitors)**

Dr T R Bradley (Department of
Haematology & Oncology, Peter
MacCallum Cancer Institute)

Co-Investigator: Dr I A Cooper

**Cancer Gene Activity: Control of SRC-
Family Tyrosine Kinases**

Dr H-C Cheng (Department of
Biochemistry & Molecular Biology, The
University of Melbourne)

**Role of Kallikrein Enzymes in Prostate
Cancer**

Dr J Clements (Prince Henry's Institute of
Medical Research)

**Regulation of Protein Kinases that Control
Cell Growth**

Prof B E Kemp (St Vincent's Institute of
Medical Research)

Co-Investigator: Mr C M House

Designing Better Chemotherapy Drugs

Dr M W Parker (St Vincent's Institute of
Medical Research)

**Circumventing Multidrug Resistance to
Taxanes in Chemotherapy**

Dr D Rischin (Department of
Haematology & Oncology, Peter
MacCallum Cancer Institute)

Co-Investigators: Dr M D Woodcock, Dr
R Hicks, Dr J F Bishop

**Role of Vascular Endothelial Growth
Factor in Ovarian Tumour Angiogenesis**

Dr P Rogers (Department of Obstetrics
and Gynaecology, Monash Medical
Centre)

Co-Investigators: Dr B Susil, Prof D L
Healy

**Optimizing Chemotherapy Schedules for
Concomitant Use in Radiotherapy**

Dr L Webster (Department of
Experimental Chemotherapy &
Pharmacology, Peter MacCallum Cancer
Institute)

Co-Investigators: Dr M A Joschko, Dr J F
Bishop, Dr D L Ball

**Influence of Distal Colonic Fermentation
on Development of Bowel Cancer**

A/Prof G P Young (Department of
Medicine, The University of Melbourne,
Royal Melbourne Hospital)

Co-Investigator: Dr P R Gibson

Year of Commencement: 1995

**Role of the Mammalian Son of Sevenless
Proteins in Cell Growth and Cancer**

Dr D D L Bowtell (Peter MacCallum
Cancer Institute)

**An Investigation of the Role of the ERG
Proto-Oncogene in Cancer**

Dr I Kola (Molecular Genetics and
Development Group, Monash Medical
Centre)

Co-Investigator: Dr P J Hertzog

**Cytoskeletal Suppressors of Oncogenic
RAS**

Dr H Maruta (Epithelial Biochemistry
Laboratory, Ludwig Institute for Cancer
Research)

**The Role of Inositol Triphosphate in Cell
Growth**

Dr C A Mitchell (Department of
Medicine, Monash University, Box Hill
Hospital)

Design of Human Glutathione S-Transference Inhibitors

Dr M W Parker (St Vincent's Institute of Medical Research)

Transgenic Mouse Model for Lymphocyte-Mediated Cancer Therapy

Dr M J Smyth (Cellular Cytotoxicity Laboratory, Austin Research Institute)

Co-Investigator: Dr J A Trapani

Epidemiological Differences Between Human Papillomavirus Positive and Negative Dysplasia of the Cervix

Dr S N Tabrizi (Department of Microbiology, The Royal Women's Hospital)

Co-Investigators: Dr S M Garland, Prof M A Quinn, Dr C K Fairley

Mapping the Proteins that Control Cell Multiplication

Prof B H Toh (Department of Pathology and Immunology, Monash University Medical School)

The Role of Vascular Growth Factors in Solid Tumour Growth

Dr A F Wilks (Growth Regulation Laboratory, Ludwig Institute for Cancer Research)

Co-Investigator: Dr S A Stacker

Role of Cytotoxic Drugs in Expression of the Multidrug Resistant Phenotype

Dr J R Zalcberg (Department of Oncology, Austin & Repatriation Medical Centre, Repatriation Campus)

Year of Commencement: 1996

Attention Deficits and Slowed Processing Skills Following Cranial Irradiation

Dr V Anderson (Department of Psychology, University of Melbourne)

Co-Investigators: Mr T Godber, Dr E Smibert

A Study of the Genetic Control of the H19 and IFG-II Genes in Development and Neoplasia

Prof F Beck (Howard Florey Institute)

Co-Investigator: Dr P V Senior

Molecular Pathogenesis of Ovarian Tumours

Dr P J Fuller (Prince Henry's Institute of Medical Research)

Co-Investigator: Prof H G Burger

Retroviral Vector Design Using Cre-LoxP Recombination

Dr S M Jane (Rotary Bone Marrow Research Laboratory, Royal Melbourne Hospital Research Foundation)

Structure and Function of UV Damage Repair Regulating Protein Kinases

Prof B E Kemp (St Vincent's Institute of Medical Research)

PTH-Related Protein in Breast Cancer and Metastatic Invasion of Bone

Dr J M Moseley (St Vincent's Institute of Medical Research)

Co-Investigators: Dr M T Gillespie, Prof T J Martin

Mapping and Identification of a Tumour Suppressor Gene for Ocular Melanoma

Prof J F Sambrook (Peter MacCallum Cancer Institute)

Study of Breast and Ovarian Cancer after Infertility and IVF

Dr A Venn (Centre for the Study of Mothers' & Children's Health)

Co-Investigators: Ms L Watson, Prof D L Healy, Dr G G Giles

Regulation of the Protein Kinase Encoded by the c-akt Oncogene

Dr R B Pearson (Peter MacCallum Cancer Institute)

Retroviral Gene Therapy of Brain Tumours

Dr M Saleh (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Year of Commencement: 1997

Investigation of Novel Tumour Suppressor Genes on Chromosome 9p in Lung Cancer

Dr L J Campbell (Victorian Cancer Cytogenetics Service, St Vincent's Hospital)

Co-Investigator: Dr L B Irving

Enzymology of SRC-Family Tyrosine Kinases & CSK-Family-Tyrosine Kinases

Dr H-C Cheng (Department of Biochemistry & Molecular Biology, The University of Melbourne)

In Vitro Model for Identification of a Tumour Suppressor Gene

Dr W D Cook (Department of Surgery, The University of Melbourne)

Role of Fibre Fermentation and Short-Chain Fatty Acids in Colorectal Tumorigenesis

A/Prof P R Gibson (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Chemoprevention of Colorectal Cancer: A Comparative Study of Standard NSAID Therapy and COX-2 Inhibition

Prof P E O'Brien (Department of Surgery, Monash University, Alfred Hospital)

The Role of Mutagenesis and Epimutagenesis in Childhood Neoplasms

Prof P J Smith (Department of Haematology/Oncology, Royal Children's Hospital)

Co-Investigator: Dr N Parker

Variation in Androgen Receptor Function in Prostate Cancer

A/Prof J D Zajac (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Mr M Frydenberg

Year of Commencement: 1998

The Function of Vascular Endothelial Growth Factor-D in Tumour Formation

Dr M G Achen (Ludwig Institute for Cancer Research)

Co-Investigator: Dr S A Stacker

Insulin Like Growth Factor (IGF) Binding Protein 6 and IGF II Dependent Tumours

Dr L A Bach (Faculty of Medicine, The University of Melbourne, Austin & Repatriation Medical Centre)

Co-Investigator: Dr R H Whitehead

Evaluation of a New Gene, Cdx2, in the Genesis of Colon Cancer

Prof F Beck (Howard Florey Institute)
Co-Investigator: Ms K Chawengsaksophak

The Role of IRF 3 in Tumourigenesis

Dr P J Hertzog (Institute for Reproduction & Development, Monash University)

The Role of the EWS/FLI-1 Gene in Ewings Sarcoma and the Biological Function of the EWS Gene

Prof I Kola (Institute for Reproduction & Development, Monash University)
Co-Investigator: Dr P J Hertzog

The Role of Inositol Triphosphate in Cell Growth

A/Prof C A Mitchell (Monash Medical School, Monash University, Box Hill Hospital)
Co-Investigator: Dr C Speed

Investigating Aberrant Expression of c-Myb in Colon Tumour Cells

Dr R G Ramsay (Peter MacCallum Cancer Institute)

The Potential Role of Cytotoxic Lymphocytes in Tumour Immunotherapy

Dr M J Smyth (Austin Research Institute)
Co-Investigators: Dr J A Trapani, Dr P K Darcy

Year of Commencement: 1999

Identification of Molecular Events that Regulate BRCA-1 Mediated Tumourigenesis

Dr M Brown (Department of Biochemistry & Molecular Biology, The University of Melbourne)

Search for Novel Tumour Suppressor Genes on Chromosome 9p21 in Lung Cancer

Dr L J Campbell (Victorian Cancer Cytogenetics Service, St Vincent's Hospital)
Co-Investigator: Dr L B Irving

The Roles of Urokinase Plasminogen Activator System and Osteoclast Resorption in the Development of Osteosarcoma

Prof P Choong (Department of Orthopaedics, St Vincent's Hospital)
Co-Investigators: Dr J Fisher, Dr H Zhou

PTH-Related Protein in Breast Cancer and Metastatic Invasion in Bone

Dr M T Gillespie (St Vincent's Institute of Medical Research)
Co-Investigator: Prof T J Martin

Impact of Genetic Testing for Hereditary Non-Polyposis Colorectal Cancer (HNPCC) on Psychological Adjustment, Screening Compliance and Decision-Making in Regards to Preventative Strategies

Dr J Halliday (Murdoch Children's Research Institute)
Co-Investigators: Ms B Meiser, Dr D J B St John, Dr C Gaff

Molecular Design and Biological Analysis of Antagonists of Vascular Endothelial Growth Factor D

Dr R Hughes (Department of Pharmacology, The University of Melbourne)

Characterisation of the Anti-Apoptotic Function of P-Glycoprotein

Dr R Johnstone (Austin Research Institute then moved to Peter MacCallum Cancer Institute)

Supportive-Expressive Group Therapy for Women with Metastatic Breast Cancer

Prof D Kissane (Centre for Palliative Care, The University of Melbourne)
Co-Investigators: Prof S Bloch, A/Prof D Clarke, Dr R D Snyder

Molecular Targeting of Protein Kinase C- α in Human Breast Cancer Cells

Dr J-P Liu (Baker Medical Research Institute)
Co-Investigator: Dr H Li

The Role of STIM1, a Novel Transmembrane Protein in Tumours of the Nervous System

Prof P J Smith (Department of Paediatrics, The University of Melbourne)
Co-Investigators: Dr M Dziadek, Dr N Parker

The Regulation of Drug Resistance Genes by the JNK Stress Response Pathway

Prof J R Zalcberg (Department of Haematology & Medical Oncology, Peter MacCallum Cancer Institute)
Co-Investigator: Dr P Kantharidis

Year of Commencement: 2000

Molecular Basis for the Dysregulated Growth Control Through the Proto-Oncogene *c-fms* in Myeloid Leudemic Cells

Prof J A Hamilton (Department of Medicine, The University of Melbourne, Royal Melbourne Hospital)
Co-Investigators: Dr X Csar, Dr N Wilson, Dr D Marks

Victorian Paediatric Cancer Family Study

Prof J L Hopper (Department of Haematology & Oncology, The University of Melbourne, Royal Children's Hospital)
Co-Investigators: Dr E Smibert, Dr A Mitchell, Dr K D Waters

Development of Non-Invasive Imaging of Subsurface Melanomas In Vivo by Miniaturised Fibre Optic Confocal Microscopy

A/Prof R King (Department of Pharmacology, Monash University)
Co-Investigators: Dr L Vo, Mr P Delaney

Randomised Trial of Radiotherapy (RT) vs Chemo/RT for Stage I-II Follicular Lymphoma

Dr M MacManus (Peter MacCallum Cancer Institute)
Co-Investigator: Dr J Seymour

A Trial of Aspirin and/or Resistant Starch in People at Risk of Hereditary Colorectal Cancer

A/Prof F A Macrae (Department of Gastroenterology, Royal Melbourne Hospital)
Co-Investigators: A/Prof D J B St John, Dr B Leggett, Prof J Jass

The Role of Hyaluronan in Brain Tumour Invasion

Dr U Novak (Department of Surgery, The University of Melbourne, Royal Melbourne Hospital)

Co-Investigator: Dr A H Kaye

Defining Aspects of the Mechanisms of Ionising Radiation-Induced DNA Rearrangement in Mammalian Cells

Dr I R Radford (Peter MacCallum Cancer Institute)

Regulation of the Epithelio-Mesenchymal Transition in Human Breast Cancer Cells

Dr E Thompson (Victorian Breast Cancer Research Consortium)

Co-Investigators: Dr L Ackland, Dr D Newgreen

Regulation of the Protein Tyrosine Phosphatase TCPTP

Prof T Tiganis (Department of Biochemistry & Molecular Biology, Monash University)

Immunotherapy of Cancer Using Genetically Engineered T Cells

Dr P K Darcy (Cancer Immunology Research Laboratory, Peter MacCallum Cancer Institute)

Co-Investigators: Dr J A Trapani, Dr M J Smyth

Molecular Regulation of Migration in Normal and Neoplastic Colonic Cells

A/Prof P R Gibson (Department of Medicine, The University of Melbourne)

Co-Investigator: A/Prof E Nice

An Analysis of the Lyn Tyrosine Kinase in Myeloid Cell Tumour Suppression Using Both Loss- and Gain-of-Function Mutant Mice

Dr K Harder (Melbourne Tumour Biology Branch, Ludwig Institute for Cancer Research)

Co-Investigators: Dr M Hibbs, Prof A R Dunn

Regulation of the Human Tumour-Suppressor Protein Kinase Chk2

Dr J Heierhorst (St Vincent's Institute of Medical Research)

Year of Commencement: 2001

Tumour Volume as an Independent Prognostic Factor in Non-Small Cell Lung Cancer

A/Prof D L Ball (Division of Radiation Oncology, Peter MacCallum Cancer Institute)

MICA Expression in Malignant Melanoma: Consequences for NK and T Cell Activation

Dr A Brooks (Department of Microbiology & Immunology, The University of Melbourne)

Co-Investigator: Dr E Maraskovsky

kConFab: A National Consortium for Research into Aspects of Familial Breast Cancer

Dr G Lindeman (Department of Haematology & Medical Oncology, Royal Melbourne Hospital)

Co-Investigators: D Amor, K Kirk, G Suthers, J Goldblatt

Australian Melanoma Family Study

Dr G Mann (Department of Public Health, The University of Melbourne)

Co-Investigators: Prof J L Hopper, Dr J Aitken, Prof R Kefford, Prof G Giles, Prof B Armstrong

The Characterization of a Novel 108 kDa Inositol Polyphosphate 5-Phosphatase: Regulator of Cell Death

Prof C A Mitchell (Department of Biochemistry & Molecular Biology, Monash University)

Enhancing Ex Vivo Expansion of Primitive Haemopoietic Progenitor Cells by All-Trans Retinoic Acid

Dr L Purton (Division of Haematology & Medical Oncology, Peter MacCallum Cancer Institute)

Co-Investigators: Mr D Haylock, Dr P Simmons

The Role of Vascular Endothelial Growth Factors in the Metastatic Spread of Cancer

Dr S A Stacker (Ludwig Institute for Cancer Research)

Co-Investigator: Dr M G Achen

The Role of EphA/Ephrin-A Interactions in Cutaneous Melanoma: Effects of Eph Receptor Activation on Cell Adhesion, Mobility and Viability During Various Stages of Melanoma Progression

Dr M Lackmann (Ludwig Institute for Cancer Research then moved to Monash University)

Co-Investigator: Dr P Gibbs

A Randomised Trial of Preoperative Radiotherapy for Stage T3 Adenocarcinoma of Rectum

Dr S Ngan (Division of Radiation Oncology, Peter MacCallum Cancer Institute)

Co-Investigators: Dr S-A McLachlan, Mr J MacKay, Dr R Fisher

The role of a Novel Suppressive T Cell Subset, Tr1, in Breast Cancer Immunity

Prof M Plebanski (Austin Research Institute)

Co-Investigator: Prof I F C McKenzie

Year of Commencement: 2002

EGF-Dependent Alpha-v Beta-6 Integrin-Mediated Regulation of Colon/Ovarian Cancer Growth and Metastasis

Dr N Ahmed (Royal Women's Hospital)

Co-Investigator: A/Prof M A Quinn

Regulation of the Tumour Suppressor PTEN by Phosphorylation and Oligomerization

Dr H-C Cheng (Department of Biochemistry & Molecular Biology, The University of Melbourne)

Urokinase Plasminogen Activator and Osteoclast Systems Regulate Growth and Progression in Osteosarcoma

Prof P Choong (St Vincent's Hospital)

Co-Investigator: Dr H Zhou

Role of Estrogens in Prostate Malignancy

A/Prof G Risbridger (Institute of Reproduction & Development, Monash University)

A Structural Investigation into the Role of the Alpha-v Beta-3 Integrin in Cancer

Dr J Rossjohn (Department of Biochemistry & Molecular Biology, Monash University)

Interactions Between Cell Cycle and Differentiation Processes in Normal and Malignant Osteoblasts

Dr D Thomas (Department of Medicine, The University of Melbourne)

Co-Investigator: Dr M Trivett

Year of Commencement: 2003**Molecular Epidemiology of Ovarian Cancer: Australian Ovarian Cancer Study - Western Australia, Tasmania and a National Clinical Follow-up Core**

Prof D D L Bowtell (Peter MacCallum Cancer Institute)

Co-Investigators: Dr A de Fazio, D Wyld, D Whiteman, D Gertig, M Friedlander, P Harnett, M Davy, P Blomfield, N Zeps

The Tumorigenic Effect of Overexpression of DNA Methyltransferases on the Intestinal Epithelium

M Ernst (Colon Molecular & Cellular Biology Unit, Ludwig Institute for Cancer Research)

Co-Investigator: Prof P Waring

A Novel Human DNA Damage Response Protein that Interacts with the CHK2 and PML Tumour Suppressors

Dr J Heierhorst (St Vincent's Institute of Medical Research)

Mechanisms of Action of Histone Deacetylase Inhibitors: Novel Anti-Cancer Drugs

Dr R Johnstone (Peter MacCallum Cancer Institute)

A Trial of Aspirin and/or Resistant Starch in People at Risk of Hereditary Colorectal Cancer (CAPP2)

F A Macrae (Department of Gastroenterology, Royal Melbourne Hospital)

Co-Investigators: B Leggett, J Jass

The Role of the Proto-Oncogene PU.1 in Haemopoiesis

S Nutt (Immunology Division, Walter & Eliza Hall Institute of Medical Research)

Co-Investigator: L Wu

Protein Phosphatases and Mitosis

T Tiganis (Department of Biochemistry & Molecular Biology, Monash University)

Mechanisms of Cross-Presentation in Dendritic Cells

J Villadangos (Immunology Division, Walter & Eliza Hall Institute of Medical Research)

FZD7 Signalling in Colon Cancer

E Vincan (Peter MacCallum Cancer Institute)

Co-Investigator: W Phillips

SOCS Genes in the Mammary Gland and Other Organs - Potential Tumour Suppressor Genes?

Dr J Visvader (Victorian Breast Cancer Research Consortium)

Isolation and Characterisation of Leukaemia Mutants in Zebrafish

A Ward (School of Biological & Chemical Sciences, Deakin University)

Year of Commencement: 2000**[11C] AG1478 - A Potential PET Tracer for the Molecular Imaging of the EGF Receptor in Glioblastoma Multiforme**

U Ackermann (Austin Health)

Co-Investigators: H Tochon-Danguy, G O'Keefe

Caveolin-1 Regulation of Breast Cancer Growth and Metastasis

Dr R L Anderson (Peter MacCallum Cancer Institute)

Biomolecular Fingerprints as Early Diagnostic Indicators of Ovarian Cancer

I Campbell (Peter MacCallum Cancer Institute)

Co-Investigators: K Mitchelhill, A Dobrovic, G Rice, M A Quinn, N Ahmed

Molecular and Functional Analysis of the Chromosome 7q31 Tumour Suppressor Gene ST7

I Campbell (Peter MacCallum Cancer Institute)

A Phase III Study of Regional Radiation Therapy in Early Breast Cancer

B Chua (Peter MacCallum Cancer Institute)

Co-Investigators: D Joseph, J Harvey, V Ahern

Preclinical Development of Gene-Engineered T Cells for Immunotherapy of Cancer

Dr P K Darcy (Peter MacCallum Cancer Institute)

Co-Investigators: Dr M Kershaw, Dr J A Trapani

The Timing of Androgen Deprivation in Relapsed or Non-Curable Prostate Cancer Patients

G Duchesne (Peter MacCallum Cancer Institute)

Co-Investigators: N Spry, A Stapleton, H Gurney, E Beller

The Role of Mammalian Scribble in Proliferation and Tumourigenesis

P Humbert (Peter MacCallum Cancer Institute)

Co-Investigators: S Russell, H Richardson

Use of Retinoids and Inhibitors of Endothelial Cell Adhesion Molecules to Enhance Mobilisation of Haemopoietic Stem Cells by G-CSF

J Levesque (Peter MacCallum Cancer Institute)

Co-Investigator: L Purton

Role of the PIPP Lipid Phosphatase in Cell Differentiation and Polarity

Prof C A Mitchell (Monash University)

Post-Translational Regulation of the Pro Apoptotic Protein BIM

H Puthalakath (Walter & Eliza Hall Institute of Medical Research)

Pesticide Exposure and Cancer in Fruit Growers and Orchardists

M Sim (Monash University)

Co-Investigator: G Benke

Year of Commencement: 2005

Regulation of Activity and Subcellular Localisation of the Tumour Suppressor PTEN

Dr H-C Cheng (The University of Melbourne)

Co-Investigators: Dr H-J Zhu, Dr T Mulhern

The Resistance of Growth Plate Cartilage to Invasion by Tumour: PEDE, a Potent Anti-Angiogenic Factor Regulates Osteosarcoma Behaviour

Prof P Choong (St Vincent's Hospital)

Co-Investigator: J Ojaimi

Victorian Paediatric Cancer Family Study

Prof J L Hopper (The University of Melbourne)

Co-Investigators: Dr E Smibert, Dr A Mitchell, Dr K D Waters

The Tumour Cell-Specific Nuclear Targeting Signal of Chicken Anaemia Virus VP-3: Potential for Anti-Tumour Therapy

D Jans (Monash University)

Targeting CDK2 in Breast Cancer Associated with Mutations in BRCA1

G McArthur (Peter MacCallum Cancer Centre)

Analysis of the Interaction of the T-Cell Oncoproteins Sc1 and Lmo2 as a Therapeutic Target for T-Cell Acute Lymphoblastic Leukaemia

M McCormack (Royal Melbourne Hospital)

Co-Investigators: S M Jane, D Curtis

Randomised Phase II Study of Two Regimens of Palliative Chemoradiation Therapy in the Management of Locally Advanced Non Small Cell Lung Cancer

M Michael (Peter MacCallum Cancer Centre)

Co-Investigators: B Burmeister, A Wirth

Development and Evaluation of a Transgenic Mouse Model for Anti-Human A33 Targeted Therapy

A Scott (Ludwig Institute for Cancer Research)

Co-Investigator: V Rayzman

Intermediate and High Risk, Resected Gastro-Intestinal Stromal Tumours Expressing Kit: RCT of Adjuvant Imatinib Mesylate

J Simes (Peter MacCallum Cancer Centre)

Co-Investigators: J R Zalcberg, P Waring, B Mann, M Smithers, D Kotasek, G Van Hazel

TRAIL-Mediated Immunosurveillance, Immunoselection and Immunotherapy of Cancer

A/Prof M J Smyth (Peter MacCallum Cancer Centre)

I *Index of names*

A

Abell, D A 92
Achen, M G 115, 119
Ackermann, U 120
Ackland, L 118
Ackland, T 31
Ahern, V 121
Ahmed, N 119
Aitken, J 118
Alewood, P F 106
Allcock, E A 65
Allen, B J 105
Allen, D 88, 90, 91
Allen, D E 91
Amor, D 118
Ananthakrishnan, R 90
Anderson, J W 76
Anderson, R 62, 78
Anderson, R L 107, 112, 120
Anderson, V 109, 114
Andrews, F J 111, 112
Andrews, J T 80
Angell, R 71, 73
Azarmie, S 75

B

Bach, L A 115
Bachelard, H S 64
Baikie, A 30
Baikie, A G 73, 75, 76, 79
Bailey, L 89
Bailie, M J 66, 70
Baker, H W G 83, 84, 85
Ball, D L 113, 118
Bankier, A 87
Banwell, M G 105, 106
Barkla, D H 87, 88, 89, 91, 92,
97, 101
Barlow, J 88
Barnes, G L 88, 98
Barton, P 88
Bazeley, V 15
Beck, C 80, 81, 82, 83, 84
Beck, F 110, 114, 116
Begley, C G 61, 107, 111, 112
Begley, G 44, 46
Beischer, N A 92

Bell, R 89
Bellair, J T 82, 83
Beller, E 121
Benke, G 121
Bennett, R C 96, 97, 98
Berci, G 65, 68, 70, 73, 75, 76
Berndt, M C 59
Bertoncello, I 85, 108
Bettinger, H 31
Bhathal, P S 73, 76
Bird, P I 111
Bishop, J F 99, 103, 105, 113
Bishop, R 98
Black, M J 89
Blackwood, M 71, 73, 75
Blainey, B 76
Blair-West, J R 68, 73, 76, 78, 80,
81, 82, 83
Blamey, R W 83
Bloch, S 117
Blunck, J M 77, 79, 80, 93, 94
Bock, F 12
Borjesson, B 88
Borland, R 36
Bornstein, J 30
Bottomley, W 71, 73
Bowtell, D D L 111, 113, 120
Boyd, A 62
Boyd, A W 109, 111
Boyd, G W 73, 76
Boyd, R L 100, 105, 107
Boyda, E 84, 85
Brackenridge, C J 75, 76
Bracks, S 54
Bradley, B S 103
Bradley, R 19, 43
Bradley, R G 70
Bradley, T R 64, 65, 68, 72, 73, 75,
76, 78, 79, 84, 85, 98, 104, 113
Branster, M 63, 64
Brasch, J 107
Bremner, D A 70
Brennan, M D 89
Briggs, G W 63
Brodie, G N 85, 100
Brooks, A 118
Brown, H L G 85, 86
Brown, J B 87, 88, 90, 94
Brown, K D 72
Brown, M 76, 116
Browning, F S C 87
Brownlee, R T C 98, 103, 104
Bruce, M I 71, 73

Bruce, P T 75
Buckley, I K 71
Buckley, M 104, 106
Bui, A 91
Burger, H 30
Burger, H G 82, 83, 84, 85, 86, 87,
88, 90, 91, 93, 108, 114
Burgess, A W 110
Burgess, T 45
Burmeister, B 122
Burnet, F M 42, 44, 46
Burnet, P 16, 18
Burns, G 62
Burnstock, N 73
Burton, R 22, 37
Butler, L 33

C

Caldwell, F H 68
Caligiore, P 94, 97, 98, 99
Cameron, D P 87
Cameron, D W 93, 105
Campbell, I 121
Campbell, L J 109, 111, 115,
116
Campbell, N R 82
Campbell, P E 88
Carden, G 13, 14, 20, 21, 32, 54,
59, 61
Carden, J 20
Carey, J E 70, 73
Carnegie, P R 84, 85, 86
Carr, D J 67
Carreras, J 20, 54
Carson, N E 96, 97
Cass, M 70, 73
Catt, K J 77, 78, 79, 80, 81, 82
Cauchi, M N 82, 83, 84, 85, 87
Chait, L A 88
Chalmers, P J 90
Chamberlin, M 97
Chanen, W 65, 71
Chawengsaksophak, K 116
Cheers, C 85
Cheng, H-C 113, 115, 119, 121
Cherry, T 8, 9
Choong, P 116, 119, 121
Chow, C W 88

Christie, G S 66, 68, 70, 71, 73,
75, 77, 80
Christopherson, R I 100
Christophidis, N 90, 103
Chua, B 121
Clark, A C L 71, 73, 74, 75, 77
Clarke, D 117
Clements, J 113
Clemmesen, J 12
Clunie, G A 59
Clunie, G J A 91, 93, 94, 102
Coates, D A 69
Coghlan, J P 68, 73, 76, 78, 80,
81, 82, 83
Cole, P 87
Colebatch, J 15, 23, 24, 25, 26, 27,
28, 32, 33, 62, 66, 68, 70, 71, 73,
75, 77, 78, 79, 80, 124
Colebatch, J H 66, 68, 70, 71, 73,
75, 77, 78, 79, 80
Coleman, P 61
Connellan, J M 106, 107
Connors, T A 76
Cook, J W 16
Cook, W D 107, 115
Cooper, H M 112
Cooper, I A 113
Corrie, J A 78, 79
Cory, S 45, 47
Cowlshaw, B 65
Cowman, A F 112
Cox, K R 68, 70, 71, 74, 75, 77,
80, 81
Crisp, G T 105
Critchley, J E 82
Csar, X 117
Cunning, M 74
Curtis, D 122
Cutbush, L R 90, 91

D

Danks, J A 112
Darcy, P K 116, 118, 121
Davids, J 65, 68
Davies, D J 83, 84, 85, 86, 87
Davies, W 64, 65, 71, 74, 75, 78
Deacon, G B 98, 102, 106, 109,
110
Deacon, N J 103

de Boer, W G R M 77, 78, 80,
81, 82, 93
de Burgh, P 17, 48
de Fazio, A 120
de Gruchy, G C 68, 70, 71, 76
de Kretser, D M 84, 85, 86, 87
de Kretser, T A 100, 102, 103
Delaney, P 117
DeLuise, M A 108
Dennett, X 77
Denton, D A 68, 71, 73, 76, 78,
80, 81, 82, 83
Devine, H 7, 8, 9
Dick, A 3, 37
Dietszsch, E 108
Dobrovic, A 121
Doe, W F 110
Doll, R 12
Donaldson, A 53
Donnelly, B 30, 85, 86
Dorling, P R 81, 83
Doy, C H 72
Drake, M 79, 86, 88, 90, 91, 92,
94
Duchesne, G 121
Duncan, J F 70, 72
Duncan, J T 66, 68
Dunlop, E 28, 32, 61
Dunn, A R 109, 118
Dyall-Smith, D J 103, 106
Dyall-Smith, M L 106
Dziadek, M 117

E

Eddy, C E 63
Edman, P 66, 68, 70
Edwards, S 92
Eisman, J A 96, 97, 98
Ekert, H 77, 78, 79, 91, 93, 94,
109
Elefanty, A 32
Elfanty, A 62
Ellims, D H 98
Ellims, P H 90
Ellis, W M 93, 94
Ennis, G C 84
Ernst, M 120
Escott, M 73
Ewing, M R 75

F

Fail, L 85
Fairley, C K 114
Feld, H 68
Feutrill, G I 93
Finch, L R 72, 85, 88, 91, 106
Findlay, D M 108
Firkin, B G 59, 83, 84, 95
Firkin, F C 96, 102, 103, 107,
108
Fisher, J 116
Fisher, R 119
Fleischer, J 74, 75
Fleming, 63
Fleming, B 29
Fletcher, D R 97
Flore, H 16, 17
Fogdestam, I 89
Forbes, J F 83, 84, 93, 94
Fortune, D 87, 88
Fowler, R 11, 12, 13, 15, 24, 31,
32, 70, 73
Fowler, R, Jr 13
Fox, R M 59, 86, 87, 105, 107,
108, 111, 112
Francis, D M A 102
Francis, G 90
Franklin, J 90
Freidin, J 29, 63
Frisch, N C 94
Fry, P 84, 85
Frydenberg, M 115
Fuller, P J 114
Funder, J W 80, 86, 91, 93, 95,
96, 104
Furth, J 18

G

Gaff, C 116
Gan, T E 95
Gardiner, L 27
Gardner, G 29
Garland, S M 114
Garson, M 30
Garson, O M 75, 79, 80, 81, 87,
89, 90, 95, 99, 102, 103, 104,
107, 108, 109, 111

Gelai, N J 91
Gertig, D 120
Ghiggino, K P 102
Ghose, T 78, 80, 81
Gibbs, P 119
Gibson, P R 106, 113, 115, 118
Giles, G 34
Giles, G G 115, 118
Gillespie, M T 109, 114, 116
Godber, T 114
Godfrey, G 63, 64
Goding, J R 68, 73, 76, 78
Goding, J W 102, 104, 106, 110
Goldblatt, J 118
Gonzales, M F 109
Gordon, P 77
Gourlay, S G 108
Gray, B N 96, 97, 98
Gray, N 12, 24, 28, 32, 33
Gray, P J 86
Green, C R 68, 70, 72, 79
Green, M 105
Grigg, A 112
Grill, V 112
Grimwade, R 14, 85, 86, 87, 89,
100
Guli, E P 83, 84, 85, 86
Gurney, H 121

H

Hale, G 66
Halliday, J 116
Hamilton, J A 97, 100, 102, 108,
110, 117
Hard, C 62
Harder, K 118
Hare, W S C 75, 80, 104
Harris, H 16, 17, 18
Harris, R A 102
Harvey, J 121
Haw, C S 87
Haylock, D 119
Haylock, J 70, 72
Hayman, J A 108
Healy, D L 108, 113, 115
Heierhorst, J 118, 120
Herington, A C 93, 104
Herschell, C 13
Hertzog, P 83

Hertzog, P J 113, 116
Hibbs, M 118
Hicks, R 113
Hill, A M 63
Hill, D 1, 4, 35
Hill, J S 108, 110
Hillcoat, B 105
Hillcoat, B L 106
Hilton, D 43, 44
Hohlov, N S 31
Hohlov, S 64, 67, 69
Holloway, B W 59
Holmes, M 43
Hoogenraad, N J 86, 88
Hopper, J L 106, 117, 118, 122
Hosking, C S 98, 103
House, C M 106, 109, 113
Howard, R N 71
Howlett, G J 88
Hudson, B 85, 86
Hughes, E S R 76, 87, 92, 93,
94, 96, 99
Hughes, P 29, 62
Hughes, P E 64, 65, 66, 69, 70
Hughes, R 117
Humbert, P 121
Hunt, P S 84, 85, 87
Hurley, J 63, 64
Hurley, J V 74
Hurley, T 31
Hurley, T H 92
Hurwitz, P J 88

I

Irving, L B 111, 115, 116
Italia, J 60

J

Jabara, A 29
Jabara, A G 66, 69, 72, 74, 75,
80, 81, 82, 83, 84, 85, 86, 88,
89, 90, 91, 93
Jack, I 93, 95, 100
Jago, M 73
Jamieson, G P 100, 111

Jane, S M 114, 122
Jans, D 122
Januszewicz, E H 105
Jaskewycz, T 77
Jass, J 117, 120
Jeney, A 76
Johansen, P 70
Johns, R B 74, 75, 77
Johnson, N 65
Johnson, W J 99
Johnson, W R 96
Johnston, C I 93, 95
Johnston, N 66
Johnstone, R 117, 120
Jonas, H A 105
Jones, S 92
Joschko, M A 113
Jose, D G 86, 89, 100
Joseph, D 121
Judson, R T 102

K

Kannourakis, G 110
Kantharidis, P 117
Kaye, A 30
Kaye, A H 102, 105, 108, 109,
110, 112, 118
Kaye Scott, R 7, 9, 10, 29
Kefford, N P 71, 73
Kefford, R 118
Kelly, D P 97, 102, 109
Kemp, B E 97, 100, 104, 106, 109,
113, 114
Keogh, E V 11, 12, 13, 15, 18, 24,
27, 28
Kerr, F 11
Kershaw, M 121
Khalid, B A K 91, 95
Kidson, C 62, 69, 72
Kilpatrick, W J 25, 32, 62
King, E 16
King, E S J 64, 66, 69, 71
King, R 117
Kirk, K 118
Kirszbaum, L 101
Kissane, D 117
Kitson, G E 11
Kneale, B 64
Kola, I 31, 113, 116

Kont, L 65, 68
Kriegler, A B 98, 104, 108
Kune, G A 96

L

Lackmann, M 119
Lambert, J R 101
Landy 53
Laverty, C 87
Lawlor, D L 95
Lee, B T O 90
Lee, G T 93
Leggett, B 117, 120
Lennon, V 99
Le Page, R N 66, 68, 70, 71, 73,
77, 81, 83
Levesque, J 121
Leyden, M J 99, 100, 101
Li, H 117
Li, S F 111
Lindeman, G 118
Linnane, A W 89, 95, 105, 108
Liu, J-P 117
Louis, C J 29, 64, 65, 66, 69, 96,
101
Louis, W J 89, 90
Lovell, R 26
Lowe, T 9
Lowe, T E 59
Lucas, I 90
Luke, H A 66

M

Ma, J 93
MacCallum, P 7, 10, 11, 14, 16, 27,
59, 98, 100, 102, 103, 104, 105,
106, 107, 108, 109, 110, 111,
112, 113, 114, 115, 116, 117,
118, 119, 120, 121, 122
Macdonald, C 65
Macfarlane Burnet, F 14, 27
MacKay, I R 105, 108
MacKay, J 119
MacLeod, A M 86, 87, 88
MacMahon, B 87

MacManus, M 117
Macrae, F A 92, 94, 98, 99, 101,
104, 117, 120
MacRae, K 92
Madigan, J P 84
Malinek, M 76
Mann, B 122
Mann, G 118
Maraskovsky, E 118
Marks, D 117
Marks, G N 89, 90, 91
Marks, R 99
Marshall, D R 74
Marshall, V C 74
Martin, F I R 72, 74
Martin, R F 97, 102, 105, 108,
109, 112
Martin, T J 59, 82, 83, 84, 85, 90,
93, 95, 97, 99, 101, 106, 108,
112, 114, 116
Marty, J J 91, 92
Maruta, H 110, 113
Mason, T 87
Mathews, J D 89, 90, 91, 99
Matthews, R N 80
Mauritzen, C M 72, 75, 81
McArthur, G 122
McCall, C 12
McCormack, M 122
McCutcheon, A D 69
McDermott, F T 77, 79, 93, 96,
99
McDonald, I R 67
McDonald, J H 79, 80
McDonald, J R 65
McFadyen, W D 102, 106, 107
McGiven, A R 80, 81, 82, 83, 84
McGrath, K M 99, 107, 111
McInerney, E 85
McKenzie, I 30
McKenzie, I F C 89, 90, 92, 94, 95,
96, 99, 100, 101, 110, 119
McLachlan, S-A 119
McNeil, J J 108
McQuillan, M 28, 63
Medley, G 90, 91, 92
Meiser, B 116
Melick, R A 82
Menzies, D W 67, 69, 71, 74
Meszaros, M 21, 54
Metcalfe, D 1, 3, 17, 18, 19, 20, 21,
22, 23, 27, 28, 32, 41, 42, 43, 44,

45, 46, 47, 48, 49, 53, 54, 55,
59, 61, 78
Metcalfe, J 44
Metcalfe, K 42
Metcalfe, P 46, 47
Michael, M 122
Miller, G H D 83
Mills, K W 64
Milne, B J 96, 99
Minasian, L C 83, 84, 85, 86
Mitchell, K 121
Mitchell, A 91, 117, 122
Mitchell, C A 111, 113, 116, 119,
121
Mitchell, H A 105
Moffat, B 78, 79
Morgan, P J 69
Morgan, P N 72
Morgan, R W 87
Morley, J B 82
Morris, P J 82, 83, 84
Morrison, W A 86, 88, 89, 90,
96, 102
Morton, R K 63, 64
Moseley, J M 112, 114
Motteram, R 31
Mulhern, T 121
Muller, H K 82, 86, 87, 89, 92,
94, 97
Munro, J A 68
Murray, B J 101
Murray, S 85
Murray, V 108

N

Nairn, R 30
Nairn, R C 74, 76, 80, 81, 82,
83, 84, 85, 86, 87, 88, 89, 90,
96, 99
Narayan, K 109
Nayman, J 77, 79, 89, 93
Nelson, J F 83
Nelson, J G 73
Newgreen, D 118
Newman, M 95
Ng, K W 108
Ngan, S 119
Niall, H D 88
Nice, E 118

Nicholls, B 84
Nicola, N 43, 45, 47
Nind, A P P 99
Norman, J 94
Nossal, G 21, 44, 45, 46, 47, 53,
54
Novak, U 108, 110, 118
Nurcombe, V 109
Nutt, S 120

O

O'Brien, B McC 83, 84, 86, 87, 88,
89, 90, 95, 96, 98, 99
O'Brien, P E 107, 111, 112, 115
O'Keefe, D E 86, 87, 89
O'Keefe, G 120
O'Shea, J D 80
O'Sullivan, E F 84
O'Sullivan, J 59
Oeser, O 31
Ojaimi, J 121
Olver, I N 103, 105
Orian, J M 109, 112
Ovenden, S L 64, 65, 67, 69, 72

P

Panelli, D 92, 95
Parish, C R 89, 90, 92
Parish, R W 111
Parker, K G 89, 90, 91
Parker, M W 113, 114
Parker, N 115, 117
Parkin, J D 112
Parsons, I C 72, 74, 76
Pascoe, J P 84
Pateman, J A 67
Paterson, E 14
Paterson, R 14
Pearce, D 25, 59
Pearson, R B 115
Pedersen, J S 97, 99
Penfold, W 8, 9
Penington, D G 92, 95
Pepperell, R J 90, 94

Phillips, D R 86, 98, 103, 104,
109, 112
Phillips, W 120
Pietersz, G A 99, 101
Pihl, E A 87, 88, 89, 90, 93, 96,
99
Plebanski, M 119
Polglase, A L 92, 94
Porter, Q N 64, 65, 74, 75, 77
Potocnik, M 99
Powers, E 90
Pribaz, J J 98, 99, 102
Prosper, N 1, 3
Purton, L 119, 121
Puthalakath, H 121

Q

Quinn, M A 94, 114, 119, 121
Quirk, S J 109

R

Rabinov, D 72, 73
Radden, B G 82
Radford, I R 102, 107, 111, 118
Ramsay, R G 111, 116
Rankin, D 11
Rayzman, V 122
Reade, P C 95, 98, 101, 106
Redpath, R 53
Reed, B L 80
Reeve, T 82
Reich, M J 67
Reiss, J A 98, 103, 104
Rennie, G C 85, 86
Ressom, M 79
Rice, G 121
Rice, M S 77, 78
Rich, A M 105
Richardson, H 121
Risbridger, G 119
Rischin, D 113
Robertson, D M 98, 103
Roberts, A 28, 61
Robinson, W 78
Rogers, P 113

Rolland, J M 88, 89, 90, 99, 101
Rome, R M 87, 88, 94
Roos, I A G 98, 102, 105
Rose, A T 96
Rose, S 64, 70, 72
Rosenthal, N 29
Rossjohn, J 119
Rowan, K S 76
Rubbo, S D 76
Rudduck, C 107, 111
Rudduck, H B 69, 71, 74, 79
Rumma, J 86, 87
Russell, I S 69
Russell, S 121

S

Sacharias, N 95, 96
Sachinidis, J I 110
Saleh, M 115
Salem, H H 95
Sambrook, J F 114
Sandrin, M S 89, 90, 92, 111
Sawyer, W H 92, 94, 97, 98, 100,
101, 111
Schreiber, G H 87, 89, 91
Scoggins, B A 82
Scott, A 122
Scott, K 63
Seeman, E 106
Self, G 98
Selwood, T S 99
Senior, P V 110, 114
Serjeantson, S W 110
Seymour, J 117
Shafiroff, B 90
Shanmugan, N 83
Sharzer, L A 86
Shaw, F H 65, 67
Shaw, J 89, 91, 92
Sheridan, B 30
Sheridan, W P 107, 111, 112
Shiels, D O 67
Shotlander, V L 77
Shulkes, A 96
Shulman, A 75
Siemenowicz, R 78
Sim, M 121
Simes, J 122
Simmons, P 119

Simons, M J 91, 92, 94
Simpson, R 13
Sitharama-Rao, D M 70, 72
Skene, K G M 67, 72
Skinner, L H 81, 83
Smibert, E 109, 114, 117, 122
Smith, C 11
Smith, M A 88
Smith, P J 115, 117
Smithers, M 122
Smyth, D R 97, 101
Smyth, M J 112, 114, 116, 118, 122
Snyder, R D 92, 117
Spatt, T 74, 75, 77
Speed, C 116
Spiers, A 30
Spiers, A S D 73
Spry, N 121
Stacker, S A 114, 115, 119
Stapleton, A 121
Steidler, N E 95, 98, 101
Stewart, A G 112
St John, D J B 92, 94, 97, 98, 99, 101, 104, 110, 116, 117
Stone, V 31
Straffon, W G 82, 93
Stratford, B B 66, 68, 70, 74
Stribley, K 96
Sullivan, J R 89, 91, 92
Summer, M A 84
Summers, J E 88
Sumner, M A 85
Susil, B 113
Suthers, G 118
Sutton, V R 110
Swan, J 30
Swindon, T N 65
Sykes, P J 86
Szego, E 67

T

Tabrizi, S N 114
Taft, L I 71, 74, 75, 77, 78, 79
Tange, J D 67
Tannenber, A E G 83
Taupin, J 97, 98
Tauro, G P 93
Taylor, B 86

Telford, A P 77
Temperley, J R 90
Thistlethwaite, P 99
Thomas, A 29, 31, 32
Thomas, D 119
Thomas, R J S 106
Thompson, C H 100
Thompson, E 118
Thomson, J A 77
Thomson, R 94
Threlfall, G N 87
Thrower, S 77
Thurlow, P J 101, 106, 107
Thursi, J 109
Tiganis, T 118, 120
Tochon-Danguy, H 120
Todd, P 28
Toh, B H 85, 87, 89, 92, 94, 97, 99, 103, 104, 112, 114
Tonicich, G 103
Toogood, I R G 91
Townsend, S L 64, 65, 67
Toyne, P H 81, 82, 83
Trapani, J A 112, 114, 116, 118, 121
Trautner, E M 69
Tregear, G W 88
Tregloan, P A 110
Trembath, P W 92
Trichopoulos, D 87
Trikojus, V 28
Trikojus, V M 63, 64
Trivett, M 119
Tudball, C F 104
Turnbull, I 99
Tutton, P J M 87, 88, 89, 91, 92, 97, 101

V

Vajda, F J E 89, 90
van der Weyden, M B 83, 89, 90, 93, 95, 100, 101, 107
Van Driel, I 112
Varasdi, G 66, 67, 69
Varigos, G A 103
Vaughan, H 90
Vaux, D 28, 61
Venn, A 115
Villadangos, J 120

Vincan, E 120
Visvader, J 120
Vo, L 117
Vorrath, J W 83, 84

W

Wakelin, L P G 97, 98, 102, 106, 107
Walker, I D 101, 103, 104, 107
Ward, A 120
Ward, H 16, 17
Ward, H A 84, 85, 88, 89, 90, 100, 105
Waring, P 120, 122
Warwick, G 76
Waters, K D 93, 117, 122
Watson, L 115
Watts, J McK 84, 85, 87
Webber, L 108
Webster, L 113
Webster, L K 106, 109, 110
Weiner, S 62, 67, 69, 71, 72, 76, 79
Weir, P E 92
Weste, S M 75, 79
Westmore, A 1, 3, 55
Whisson, M 76
White, D O 71, 76, 77, 78, 81
Whitehead, R H 110, 111, 112, 115
Whiteman, D 120
Whiteside, M G 85, 86, 87, 88
Whiteside, W 26
Whittingham, S 99
Whyllie, R G 67
Wickham, G 106
Wiener, S 31
Wiley, J S 91, 92, 94, 97, 98, 100, 101, 106, 111
Wilks, A F 110, 112, 114
Williams, N T 103, 104, 107, 110
Williams, R A 68
Willis, G L 100
Willis, R 14, 15
Wilmshurst, J R 64, 65, 71, 74, 75
Wilson, B 70
Wilson, B M 71, 74, 75

Wilson, C W E 65, 67
Wilson, F C 82, 83, 84, 87, 89
Wilson, M 60
Wilson, N 117
Winthrope, B 99
Wirth, A 122
Wolf, M M 99
Woodcock, M D 100, 113
Woodruff, R K 92, 98, 100
Wooldridge, M 35
Wright, R 16, 17
Wright, R D 64
Wu, L 120
Wyer, H G 88
Wylde, D 120
Wyllie, R G 69, 72, 74, 76, 78

X

Xeros, N 69, 72, 74

Y

Yock, R 83
Young, G 30
Young, G P 101, 104, 106, 110,
113

Z

Zajac, J D 107, 112, 115
Zalcberg, J R 96, 103, 108, 112,
114, 117, 122
Zhou, H 116, 119
Zhu, H-J 121
Zwar, B 14
Zwar, J A 71, 73

