

Stimulus & Challenge

Dental

The voice of Dal Dental research

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Research Scholarships

The following three students are recipients of MRC Farquharson Summer Research Scholarships for 1994.

Susan Bermingham (DDS 2).

Vivian Ke (DDS 2).

Robin MacLean (DDS 1).

These three students will be working on designated projects approved by the Research Development Committee. The Dental Research News congratulates them on their success. However, we must also spare a kind thought for the students who were not successful on this occasion. MRC stipulates that the awards are only open to students in the top 20% of their class. The purpose of the MRC Farquharson Summer Undergraduate Research Scholarships is to provide a sound research educational experience for the students and encourage our undergraduates as future clinicians to consider careers in medical or dental research. Priority is given in selecting students with a proven academic ability as well as a perceived aptitude for research. The future applied scientists who will make up the profession of dentistry must seek out new knowledge in order to better serve mankind and contribute further to the body of our general knowledge.

The three successful dental students, from 1994 will join a very long list of 52 graduates who have participated successfully as students in our dental research programmes over a period of 18 years from 1977 to 1994.

NSERC Grant Submitted

The Division of Biomaterials submitted an application to NSERC for a Collaborative grant on the 27th April. The grant involves collaboration between the University of Toronto, the University of Liverpool (UK), TUNS and Biomaterials, with Earth Sciences, and Chemistry Departments at Dalhousie. The first year budget request totals \$291,228, the proposed five year budget is \$1.17 million. The project aims to synthesize bioactive materials of controlled surface activity (or biodegradability) showing direct bonding to bone. Innovative synthesis methods provide opportunities for development of improved and more sophisticated biomaterials. In the past existing materials were adopted for use as biomaterials; today it is possible for biomaterials to be customized and designed to have specific properties. It is now possible to build materials with the desired properties atom by atom. This is particularly true for wet chemical synthesis of ceramic biomaterials which can be produced having unique properties. Understanding is also being developed relative to the biological interactions between synthetic materials and natural tissues. The emphasis on biological aspects of materials has significantly improved understanding of the mechanisms involved in these interactions. Biomaterials R & D is increasingly important for an aging population in which larger numbers are surviving into old

age. The next two decades will see biomaterials used more frequently as substitutes for natural tissues. Emphasis in the past few years on "Advanced Materials" has improved the level of research devoted to this subject, resulting in the synthesis of improved materials. The science and technology of materials is broad and interdisciplinary and very relevant to the needs of society. The boundaries of biomaterials science are defined not by subject matter, but by a goal of making materials with desirable properties. Thus the field contains aspects of many disciplines. Materials development has been significantly aided by the needs of the space program and electronics industry. This combined with advances in medicine and health care has created the potential for improved biomaterials which can aid in prolonging life and relieving suffering. A major challenge facing the use of biomaterials is the elucidation of the mechanisms involved in establishment of the interface between bone tissue and implant materials. Dr. John Davies and colleagues at the University of Toronto who will be working with the Dalhousie Biomaterials group have laid a sound foundation with studies of bone cell colonization on bioceramics, and *in vitro* resorption of calcium hydroxyapatite substrata by osteoclast-like cells.

Summer Research Programs get under-way. (see page 3)

MRC Research Funding

The 1992/93 report of the MRC President shows that dental research received a similar percentage level of funding to that which has existed for the past 20 years. This has been remarkably consistent at between 1.5-2.5%. It should be noted that dental research at 2.5% was ahead of 8 other selected areas not illustrated in the bar diagram below such as: Blood, Hearing, Imaging and Nuclear Medicine, Musculoskeletal, Nephrology, Nursing, Nutrition, and Vision. Many would be surprised to find Neuroscience ahead with 15%, while Cancer (3.8%) and Drug research (3.7%) were much lower. However, considerable funding for Cancer and Drug research is obtained outside of the MRC programme. In fact many may be surprised to find that MRC funds account for only about 20% of the research funding supporting biomedical research in Canada. Other agencies, foundations, the corporate sector and provincial governments (excluding Nova Scotia) provide the balance. The MRC funding distribution by province illustrated in the bar diagram below shows that Nova Scotia with 2.3% of the funding was ranked 6th, ahead of Saskatchewan, Newfoundland, New Brunswick and Prince Edward Island. The total number

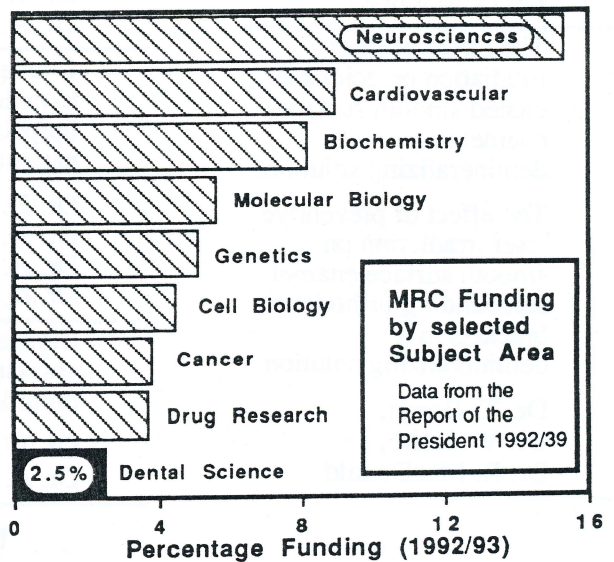
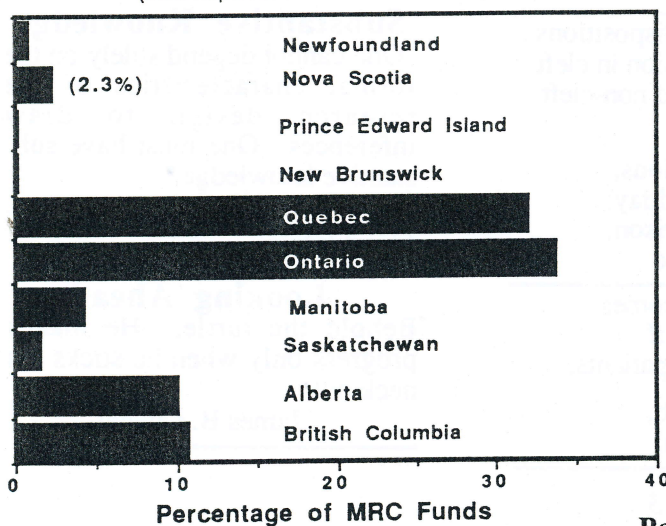
of MRC operating grants was 140,656, out of these, 3,809 were held in Nova Scotia. The total budget for MRC for 1993 was just over \$256 million, of this, 97% was spent on funding research. The low percentage spent on administration and operating costs is made possible due to the role played by researchers who devote their time free as reviewers. Committee members also serve without remuneration, with only their travel expenses paid by MRC. It is estimated that the total time donated each year in the peer-review process is over 3,600 working days, this is estimated as representing an in-kind donation by scientists of \$2 million. The 1993 budget shows that just under 60% of MRC research support was spent on operating grants, and 12.8% on multi-disciplinary research. Salary support for researchers represented 8.6% and research training support a further 10.4%. The Networks of Centres of Excellence represented 6.6% while the Human Genome Program only accounted for 0.02%. The amount of funding available to support research in 1993 was 3.42% higher than in 1992. Operating grants accounted for almost \$135 Million, University/Industry grants over \$5 million, MRC Groups \$14 million and Program

Grants almost \$16 million. The President's report also mentions that over 250 MRC University/Industry grants are currently held with budgets of about \$55 million, over half of the funding is provided by the corporate sector.

The current estimates from the peer review process of MRC indicate that 45% of all new grant applications should be funded and some 75% of renewal grants should be funded. However, the level of funding available does not permit MRC to fund more than 26% of all grants received, less than a 1 in 4 chance of being funded. In the case of new grant applications 65% are unsuccessful less than a 1 in 3 chance of obtaining support. For renewal grants the rejection rate is lower at 35%, the chances of success for renewal funding are thus 2 chances in 3. Clearly the statistical chances of new faculty members obtaining an MRC grant for the first time are very slim. However, the new broader mandate of the MRC which aims to support more clinical research opens up possibilities for our clinical faculty members. In the future it should be easier to obtain MRC funding for clinical trials which compare clinical outcomes from interventions in health care, using randomization, blinding and biostatistical methodologies.

MRC Funding by Province

(from Report of the President 1992/93)



Summer Research Programmes for 1994

The following 13 summer research projects are scheduled to be conducted during the summer by members of the Faculty of Dentistry. Six of the projects involve clinical research topics, six are laboratory studies and one involves educational development.

Medical and drug history of patients treated at Dalhousie Dental Clinic in 1993/94

Dr. C. Foong,
Dr. D. Cunningham

Clinical Epidemiological Research - Diagnosis of the early caries lesion.

Dr. A. Ismail,
Dr. B. Pass,
Dr. W. MacInnis,
Others to be named

A two part investigation to establish:

- (1) a sampling method for the collection of anaerobic bacteria from gingival pockets and
- (2) an investigation to establish the most efficient method of applying a liposome gel containing chlorhexidine in the mouth.

Dr. C. Foong,
Dr. D. Cunningham,
Dr. D. Mahoney

The effect of laser irradiation on acid/laser etched smooth surface enamel in a demineralizing solution.

The effect of preventive laser irradiation on smooth surface enamel surrounding orthodontic brackets in a demineralizing solution.

Dr. T. Boran,
Dr. W. Lobb,
Dr. R. MacDonald

Trigeminal autonomic regulation in the hypertensive rat and cardiomyopathic hamsters.

Dr. C. Foong,
Dr. G. Allen

The chemical relationship of the metal/metal oxide/porcelain interface and percent porcelain retention.

Dr. E. Sutow,
Dr. D. Jones,
Dr. A. Rizkalla

Chemical and physical properties of experimental bioactive glasses synthesized by spray-drying.

Dr. D. Jones,
Dr. A. Rizkalla

Elastic moduli and tensile strength of experimental mullite/(SiO₂-ZrO₂-Y₂O₃)/resin composite materials.

Dr. A. Rizkalla,
Dr. D. Jones

Survey of Dalhousie Dental Hygiene graduate satisfaction with periodontal curriculum.

Dr. N. Andrews,
Prof. J. Clovis

The measurement of occlusal force: assessment or function?

Dr. D. Precious,
Dr. R. Goodday,
Dr. A. Morrison

Cranial predispositions to malocclusion in cleft lip/palate and non-cleft patients.

Dr. D. Precious,
Dr. R. Goodday,
Dr. A. Morrison,
Dr. D. Bosco

Clinical outcomes assessment of orthodontic patients.

Dr. W. Lobb,
Dr. A. Ismail

Monitoring pollution in the environment using dental enamel.

Dr. B. Pass,
Dr. M. Zentilli,
Dr. D. Godfrey-Smith

MRC Renewed Vitality

The strategic planning exercise conducted by MRC is now completed. The ten Advisory Committees presented their recommendations to the March meeting of MRC. The President Dr. Friesen envisions a five-year time span for the full implementation of the new strategies. The MRC has officially set a new course for the future, one that will encompass an expansion of its role in health research. We have yet to learn the decision of the Council on the recommendations from the Advisory Committees. However, it is clear that significant changes will be forthcoming. Almost certainly Development Grants will be eliminated, the Dental Fellowship program will disappear and be integrated with the regular MRC Fellowship program. It is likely that the Dental Sciences Committee may be eliminated, however, considerable opposition has been expressed by the dental research community. Collaborative research will be combined into one program, perhaps under the title of MRC groups. Council's final decision will be announced in a forthcoming special edition of the MRC Newsletter.

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Substantive Knowledge

"One cannot depend solely on the formal characteristics of the research design to draw inferences. One must have substantive knowledge."

Ernest R. House, Educ.Res., Aug-Sept. 1991 p 2-9.

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Looking Ahead

"Behold the turtle. He makes progress only when he sticks his neck out."

James B. Conant
