



# Dental OCTOBER 1991 Research News

Research Development Office, (902) 494-1675

## VOLUME V, NUMBER 10.

### **\$2.4 Million Research Grant Activity.**

A massive research grant preparation has been conducted in the Faculty of Dentistry during August and September. The hectic activity resulted in a total of six Operating Grants being submitted to MRC two of which were University/Industry matching fund Grants. The total funding requested for the first year for all six grants was \$839,413.33. The projected three to five year budget requests were \$2,390,047. The projects involve 15 individuals, nine of whom were faculty members from Dentistry, two from Chemistry, and one each from Medicine, Geology, Pharmacy, and Physics at St. FX. An additional proposal for a Programme Grant is also in the pipe-line to be submitted to MRC in November. This proposal will in effect tie-together at

least two of these individual operating grants together with an additional project (estimated at about \$280,000 over 5 years). It should be remembered that these are only requests for grant funding and we all know the very competitive nature of the system. However, it is very encouraging to find that our small faculty has the energy, enthusiasm and drive to mount such an aggressive request for research funding. This is indeed a healthy attitude and shows that research is alive and well in the Faculty of Dentistry. However, what is even more encouraging is the fact that it also shows the excellent collaborative research interaction which we have between different departments, faculties and other institutions. Further details of the six individual MRC grants are given on page two.

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### **Dental Research Funding**

The Faculty of Dentistry at the University of McGill, Quebec's oldest dental school has been informed that it is to close by 1995. The fall edition of *McGill, News* stated that "the faculty has a poor reputation for research." A strong research base may have provided a much stronger argument to keep the faculty open as a viable institution. This news brings home to us the importance of a well balanced academic programme. It is not sufficient to have a good teaching programme, we also have an obligation to have a well rounded research and continuing education programme to serve the public and the profession. It is for this reason that our vigorous research programme within the faculty of dentistry at Dalhousie is so important at a time when questions are being asked about the future of faculties of dentistry across Canada. The specific details of the six research grants submitted by the Faculty of Dentistry at Dalhousie during September and October 1991 to MRC for the regular Operating and University /Industry programmes are as follows:-

1) Colonal Selection and Metabolic Changes Associated with Endogenous Transmission of Key Periodontal Pathogens.

H. Shah and C. Hawkins. First year request \$63,000.00.

2) Liposomal-Oral Mucous Membrane Drug Delivery System.

W. C. Foong, M. Mezei, B. B. Harsanyi, and D. Pink.

First year request \$109,663.35.

3) Polymer Biomaterials.

D. W. Jones, J. C. T. Kwak, B. S. Graham, M. Gross, W. C. Foong, B. B. Harsanyi and D. Pink.

First year request \$78,186.90.

4) Ceramic and Glass Biomaterials.

D. W. Jones, E. J. Sutow, B. Clarke, S. T. Cameron.

First year request \$148,470.08.

5) Glass Ionomer Biomaterials.

D. W. Jones, J. C. T. Kwak, S. T. Cameron, E. J. Sutow, B. Clarke, D. Pink.

First year request \$295,093.

6) Periodontal Liposomal Drug Delivery. M. Mezei, W. C. Foong, and D. Pink.

First year request \$145,000.

In addition an NHRDP grant (dental mercury hazard) for \$472,182 has also been submitted for consideration.

### **Slippery Experiment**

For those who embark upon an academic career in dentistry as teachers and research scientists, we should take heed of the words of Hippocrates:- "Life is Short, Art Long, Opportunity Fleeting, Experiment Slippery, Judgement Difficult."

### Abstracts Submitted

The following 17 abstracts have been submitted by our faculty members for the AADR meeting in Boston for March 1992.

**Boran, T.L.\***, Peters, J.F.M. and Zakariasen, K. L. Effects of Fluoride and CO<sub>2</sub> Laser Radiation on Enamel Demineralization.

**Delorey, L.M.\***, Pereirra, L.H., Chin Quee, T., Ismail, A. and Bain, C. A. Periodontal Status and TMJ Dysfunction in Association with Non-working Interferences.

**Foong, W. C.\***, Chiarot, M., Jones, D. W., Hidi, P., and Howell, R. H. *In Vitro* Cytotoxicity of selected Sebacates.

**Gerrow, J.D.\***, Price, R. B. and Harvey, A. T. A Comparison of the Surface Detail Reproduction of Flexible Die Materials.

Gerrow, J. D., Price, R. B. and Harvey, A. T. \*, Marginal Adaptation of Composite Resin Inlays Fabricated on Flexible

Ismail, A. I.\*, Brodeur, J. Gagnon, P. Prevalence of Non-cavitated and Cavitated Carious Lesions in Children.

Jones D. W., Chiarot, M\*., Johnson, J. A. Effect of Plasticizers on Creep of Methacrylate Polymers.

**Jones, D. W.\***, Rizkalla, A. S., Sutow, E. J., and Hall, G. C. Strength of Commercial and Experimental Cements.

Jones, D. W., Rizkalla, A. S\*, Sutow, E. J., Hall, G. C.

Ion-Leachable Glasses: the Effect of Temperature of Synthesis.

**Kaugars, G\*.**, Lovas, J., Silverman, S., Page, D., and Singh, V., Oral Lichenoid Reactions Associated with Vitamin Supplementation.

Lobb, W. Ismail, A. I., **Andrews, C.\***, Esthetic Status in Orthodontic Patients; Before and After Treatment.

**MacDonald, R. M\*.**, Lobb, W., Zakariasen, K., Peters, J., and Potvin, J. Comparing Debracketing Forces on Laser Etched Vs Acid Etched Enamel.

**Macinnis, W.A\*.**, Ismail, A. I. Macdonald, R M., Cunningham, D. Clinical Versus Radiographic Caries Diagnosis in Adults.

Sterrett, J. and **Mojgani, M.\*** Characterization of Root Surfaces following Various Citric Acid Application Techniques.

**Sutow, E. J\*.**, and Sykora, O. Posterior Palatal Border Opening Using a Visible Light Cured Technique.

Sutow, E. J. Doyle, G. Rizkalla, A. S. and **Robinson, A\*.** The Influence of Polishing Method on Tarnish Resistance.

Sutow, E. J., Jones, D. W., Rizkalla, A. S., Miller, R. P., and **Power, N. L\*.** Pulse Potentiostatic Method for Measuring Porcelain Retention.

### **Biomaterials Congress**

The following paper has been submitted for the 4th World Biomaterials Congress, Berlin, April 1992.

Jones, D. W.\*, Rizkalla, A. S., Sutow, E. J., Hall, G. C. Influence of Composition on Mechanical Properties of Polyalkenoate Cements.

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The following paper was given at the NIH Conference on Molecular and Comparative Nutrition in July 1991.

Brandt, R., Kaugars, G., Silverman, S., Lovas, J., Chan, W., Singh, V., Dezutti, B., and Dao, Q. Regression of Oral Lesions with the use of Antioxidant Vitamins and Beta-carotene Supplements.

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### **AADS Meeting**

The following papers have been submitted for the AADS meeting in Boston Next March.

Enhancing Related Professional Skills in the Dental Curriculum.

Bennett, I. C., Pronych, M. P., and Harrison, L.

Maintaining Faculty Member Ownership While Designing a New Integrated Predoctoral Curriculum. Gerrow; J.; Graham, B.; Lovely, F.; Hawkins, C.; MacDonald, R.; Webb, N.

Integration of Oral Biological and Behavioral Sciences into Preclinical Instruction in a New Predoctoral Curriculum. Gerrow; J.; Graham, B.; Lovely, F.; Hawkins, C.; MacDonald, R.; Webb, N.

The Educational Principles Underlying a New Integrated Predoctoral Curriculum. Graham, B. S.; Gerrow; J.; Lovely, F.; Hawkins, C.; and MacDonald, R.

Innovative Foundation Science Education in a New Integrated Predoctoral Curriculum. Lovely, F. and Gerrow; J.

Integrated Interdisciplinary Seminars in a New Integrated Predoctoral Curriculum. MacDonald, R.; Graham, B. S.; Lovely, F.

A Process to Encourage Faculty Input and Ownership in a Curriculum Review of a Predoctoral. MacInnis, W.; Gerrow; J.; Sterrett, J.; Hawkins, C.; and Hansell, P.

Outcomes Assessment of a New Integrated Predoctoral Curriculum at Dalhousie University. Murphy, J.; Webb, N.; Graham, B.

Comprehensive Patient Care in the Junior Year of a New Integrated Predoctoral Program at Dalhousie. Hawkins, C., Graham, B. S., MacDonald, R.; Gerrow; J. Lovely, F.

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### **Education**

"Sixty years ago I knew everything; now I know nothing; education is a progressive discovery of our ignorance."

Will Durant

### **Industrial Research Funding**

A chance conversation between Dean Zakariasen and a member of a biomedical company resulted in them contacting our Biomaterials group to discuss the potential for research interaction. Delicate discussions over several months were required before an agreement was reached allowing for two joint University/Industry MRC grants applications to be developed. To achieve this at a time of economic depression represents a tribute to the quality of our research and to the enterprising entrepreneurial approach of the industrial partner. The in-depth meetings with the company took place in August of this year. These meetings required the development of considerable mutual trust and understanding from both sides. The significant mutual trust which has been built up has been based upon a very professional realistic and scientific approach by both sides. This collaboration if successful in the matching fund application to MRC will represent a very major research involvement of well over one million dollars. The Dental Research Development Office wish to place on record the considerable help and assistance received from Mr. Gordon Owen of the University Technology Transfer Office, who has helped to put this complex two project programme into place. We are hopeful that the 3 year research

programme will be the preamble to a very fruitful and successful research collaboration between Dalhousie University and the Industrial Partner. It is anticipated that clinical trials will be a natural follow-up to some of the basic laboratory synthesis and development of improved biomaterials. The collaborative University/Industry research programme comes at a good time for Dalhousie University since we are increasingly being encouraged by all segments of government to develop closer relationships with the real world outside and to concentrate on research which has an identifiable end use.

### **Accountability**

The need for funding agencies such as MRC to provide the general public with an idea as to how the valuable tax \$ funds which are disbursed to university researchers are spent has become more important in recent years. For this reason researchers are requested by MRC to provide an abstract of the research project in lay terms which will be suitable for public release. It is not easy to write an abstract which clearly and simply describes in laypersons terminology the complexities of a scientific grant application. The following abstracts on pages 6 and 7 were put together for three of our recent grant submissions mentioned on page 2.

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**ABSTRACT**

**Polymer Biomaterials Grant**

Synthetic materials are increasingly being used in biomedical applications as substitutes for natural tissues. At a time when we have an aging population combined with an increasing proportion of the population surviving into old age, the application of biomaterials becomes an increasingly important subject. This project aims to develop plastics materials having specific chemical and physical properties designed to function in the body. The project deals with the interaction between the body and synthetic material which may be beneficial to health. The project will develop soft plastics coating for the fitting surface of dentures or other medical prostheses which will act as a cushion as well as slowly release drugs to treat infections in the adjacent tissues. A large number of the population are now receiving hip implants. This polymer chemistry project will also investigate chemical methods aimed at improving the mechanical properties of the plastics materials used as bone cement for hip implants.

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**ABSTRACT**

**Glass-Ionomer Cement Biomaterials Grant**

Synthetic materials are being used progressively more frequently in biomedical applications as substitutes for natural tissues. We

have an aging population combined with a larger proportion of the population surviving into old age, thus, application of biomaterials becomes an increasingly important subject. An aging population will tend to suffer from dental decay of the exposed roots of teeth. Availability of an improved filling material capable of bonding to the exposed root, thus obviating the need for drilling, will be of significant value. The release of fluoride from these materials will also provide preventive treatment against further decay.

The project deals with the interaction between the body and synthetic material which may be beneficial to health. Dental glass ionomer filling materials chemically bond to teeth and release fluoride which prevents dental decay. This project aims to develop improved tougher and stronger glass ionomer cement materials. The project will make use of high-tech synthesis methods. These custom-built dental cement filling materials will have enhanced strength designed to resist fracture during chewing. The materials should provide better performance when used as replacements for natural tooth structure.

Ceramics and glass materials are much more acceptable to the body than alternative materials which may corrode and release potentially toxic elements.

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## **ABSTRACT-Ceramic and Glass Biomaterials Grant**

Synthetic materials are increasingly being used in biomedical applications as substitutes for natural tissues. At a time when we have an increasing proportion of the population surviving into old age, the application of biomaterials becomes an increasingly important subject. The project deals with the interaction between the body and synthetic material which may be beneficial to health. This project aims to develop improved glass and ceramic materials having properties designed to function in the body. The project will make use of high-tech synthesis methods. These custom-built ceramic biomaterials will have enhanced strength designed to provide better performance when used as replacements for natural tooth structures, as ceramic coatings on teeth or as ceramic fillings or crowns (caps). Ceramic and glass materials are much more acceptable to the body than alternative materials which may corrode and release potentially toxic elements. This project also aims to investigate the development of glass and ceramic biomaterials which can chemically interact with body tissues and enhance the formation of new bone.

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## **Lasers in Dentistry**

A paper has been submitted to the Biomedical Optics Conference on Lasers, Los Angeles, Jan., 1992. Laser Scanned Fluorescence of Non-Lased/Normal, Lased/Normal, Non-Lased/Carious and Lased/Carious Enamel. Zakariassen, K. L. Barron, J. and Paton, B.

The following paper has also been submitted to the 2nd International Federation of Endodontic Association World Congress, Paris, June, 1992. Sonics in Endodontics: Research Supported Clinical Techniques. K. Zakariassen.

**Welcome Saheer and Haroun**  
We welcome the arrival of two new researchers, Dr.'s Shah and Gharbia to add to the growing critical mass of researchers in our faculty. As reported in the Dental Research News (Vol. V p.1) the year of 1991 has seen a record year for research funding of \$1.03 million for our faculty. The amazing news is that the prediction for next year is even better. In the fiscal year 1992 we have applications submitted to federal agencies with budgets of almost \$3 million. This is a good time for these talented researchers to join our faculty. It is an exciting time for dental research. These two new additions to our scientific community in dentistry will be presenting a 'Get Acquainted' presentation on Tuesday October 22nd and 29th 1991, in room 4112.