

Dental

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Research News

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Research Opportunity

The Academy of Operative Dentistry have established a Fellowship Programme directed towards the support of a dental student and a junior faculty member in a specific research project. The expectation is that the junior faculty member will initiate a research proposal involving an undergraduate dental student. A total of \$2,000 will be provided by the Academy of Operative Dentistry to fund the student working on the research project. The goals of the programme are to:

- 1) encourage the research activities of dental undergraduate students;
- 2) encourage junior faculty to engage in research, and
- 3) to further research in the area of Operative Dentistry/-Dental Materials.

The Faculty Research Development Office are willing to provide additional discretionary funding to support a successful application to cover additional costs such as

laboratory materials and supplies. Application forms and additional information are available from the Research Development Office. The Academy received eleven grant requests last year. According to the Chairman of their Research Committee Dr. Richard Norman, although the ideas expressed last year covered areas of research pertinent to operative dentistry and/or dental materials, many were not well written. The Academy of Operative Dentistry have requested that all applications are reviewed by the various institutions prior to submission. The Academy of Operative Dentistry committee believe that the Student-Faculty Fellowship Programme will help teach the art of grantsmanship (or grants-womanship). The deadline for submission to the Academy is the 1st of October 1990, the Research Development Office will require the applications to be submitted by the 17th of September for internal review.

Fluoride?

A letter to the New England Journal of Medicine by Dr. Sheila McGuire of the Harvard School of Dental Medicine suggested that bottled water may be too pure. Many in North America are turning in increasing numbers to bottled water as a healthful alternative to tap water. Dr. McGuire pointed out that the bottled water could be lacking in fluoride. Dr. McGuire tested the level of fluoride of twelve popular brands of bottled water. It was found that only one (Perrier Naturally Sparkling Mineral Water) at 1.9 ppm was in the range recommended by the EPA for fluoride in community water systems. It was suggested that for those brands of bottled water with fluoride levels below 0.7 ppm, supplemental fluorides should be taken in tablet or drop form for maintaining and improving oral health. In an age of increasing consumer awareness it is important that the results of such research are made available to the public.

However, in some cases research gets reported to the media prematurely as was the case with 'Cold Fusion'. A further example in the dental field was the preliminary non-verified findings suggesting a link between fluoride and experimental animal cancer.

This study was reported in the Medical Tribune in December 1989, which carried the headline "Fluoride Link to Bone Cancer in Fed Study". This resulted in considerable publicity in the national and international media. As a result a special Symposium was organized at very short notice just prior to the opening ceremony of the IADR meeting in Cincinnati. A review panel met in April and concluded that the two-year study showed only "equivocal evidence of carcinogenic activity" in male rats and "no evidence of carcinogenic activity" in female rats or in male or female mice. One could presumably also add that no carcinogenic activity has been found in humans which can be attributed to fluoride. A report on this subject is to be found in the June issue of the Journal of Dental Research.

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LUCK?

"to appraise the role of good luck in research, we must count against the discoveries that we attribute to good luck the discoveries we don't make through the intervention of bad luck - a number we cannot ascertain because the discoveries we don't make leave no trace"

Professor P.B. Medawar

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The Significance of Research

One of the most important aspects involved in the planning of a research project is its justification. The researcher must perform to the best of his or her knowledge, resourcefulness, and skill in communicating the ideas to reviewers in order to establish that the research will be worth the spending of valuable time, money, and effort. This is a vital stage for any research proposal, because it is designed to create a favourable impression on the very individuals who will render an opinion or judgment concerning its acceptability.

The structure of that part of a research proposal which deals with the significance, clearly requires considerable and compelling contemplation. You should ask yourself, why have I selected this particular research problem? Is there any independent opinion which suggests the need for such a study? Will the results of your research if successful revise, extend, or create new knowledge in the dental field? Does your research project have theoretical and/or practical applications? What are the various factors which have given rise to your research problem? Does your research have the potential to go beyond

the stage of reporting opinions, judgments, quantities, numbers, ratios or percentages? Will your research explain, simplify or reveal added meaning in existing knowledge? In light of the aforementioned details, why should you proceed with the investigation? Proffering questions such as this can prove to be a very beneficial exercise in the development and refinement of your research proposal. It provides an opportunity for you to think the research problem through, and to anticipate possible objections, and to formulate measures by which they can be overcome. If faults are detected in the research plan at this early stage you should have enough time available to make changes.

The reader of your grant application will want to know the significance of your research problem. You clearly have to state why you think it is a problem. You need to clearly explain what effect your investigation might have on what is now known about the subject. It will be important for you to indicate whether the emphasis of your research will be on the discovery or verification of principles or on the development of new techniques which are expected to have value for the practitioner.

Medical Technology Flourishes

According to a report by the U.S. Department of Commerce, while much of American industry languishes, the medical technology continues to flourish. The report predicts the trade surplus for the medical technology industry will reach about \$2.1 billion by the end of the year. If this holds true, the growth of the medical technology industry will outpace most U.S. manufacturing industries in 1990.

We Cannot Buy Technology. According to Ashok Vijh who was awarded the CIC medal at this year's Chemical Institute of Canada meeting held in Halifax in July, Canada can't expect to be able to become a successful competitor in the world market place by buying technology from other countries. Vijh stated that "no country has become industrially viable by buying technology". Vijh further stated that "while some innovation is sparked by market demand, most including everything from the invention of fire and the wheel to electricity and lasers was a product of someone's scientific curiosity". "If the innovation involves market forces as the paramount drive, why has a cure for baldness not been discovered yet?". he asked.

Ashok Vaijh's speech strongly stressed the importance of basic research, this was in contrast to comments from Government Services Minister Terry Donahoe who, a few minutes earlier, had told the 1,500 chemists and chemical engineers at the opening of the National Congress at the Dalhousie Arts Centre, that "we can together do things which have a scientific base which can, in fact in appropriate cases translate themselves into economic wealth". Vijh also said "despite the lip service that federal governments in the last 20 years have paid to research and development, Canada still spends just 1.32 per cent of its gross national product on it, only about half as much as other industrialized nations", he said. Vijh also said "It is the myths tying science to the marketplace that are suffocating basic research in Canada".

Inventive

"We all copy one another's successes and try new things. As people seeking wealth, health, and power we have come up with better medicines, missiles, seeds, socks, and video games. To create these, we invent. Indeed, our most powerful invention was the method of invention".

- K.E. Drexler

New Development Grant System Adopted by MRC

A new approach to Development Grants was approved by MRC in June. Under the new programme the Faculty of Dentistry will be eligible to apply for grants to develop areas of research deemed of high priority to the faculty. The previous programme limited development grants to some universities in need of scientific development. According to Dr. Lewis Slotin, Director of MRC's programmes Branch, the areas of research for which applications may be submitted may include new ones which the faculty wishes to develop or areas where they wish to build on existing research strength. The applications for this new programme are to be submitted in two phases. Under phase one, a letter is to be forwarded by the Dean to the President of the MRC, this should include information on the aim of the development, a plan for the proposed area outlining the total number of scientists expected to work in the area over the next five years, the space and location to be provided the investigators and the financial commitment made to date. The letter will also have to include information on the impact of the proposed research on and the interaction with the present research being

pursued in the faculty as well as identification of the scientists currently conducting research in this area within the faculty.

The applications for phase two have to be submitted within 18 months of approval of phase one. Salary support can only be requested to support new investigators or those who have joined the faculty within 12 months of the approval date of phase one of the programme. Applications for phase one or phase two can be made on January 1st, April 1st, June 1st, September 1st or November 1st.

Wisdom

"Research is the foundation of wisdom in the decisions we make in the realm of the application of science and scholarship in general, the quality of these decisions can be no better than the thinking that underlies them".

Dr John Polanyi, U of T.

Kim Gates Recommended to Graduate Studies for MSc.

Kim Gates who has been conducting her research project in the subject area of drug release from biomaterials successfully defended her thesis on the 18th of July and will be recommended to the Faculty of Graduate Studies for an MSc degree.

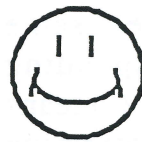
The Changing Face of Dentistry

The Research Development Lunch Time meeting held on the 18th July proved to be a great success. A total of 45 staff students and faculty attended the session. All agreed that the video film "The Changing Face of Dentistry" was an excellent film. The viewing promoted considerable discussion relating to the future directions of dental research.

Biomaterials Research

The biomaterials research group are evaluating and developing soft polymer materials which may be used in a variety of dental and biomedical applications. Many of the current commercial materials are highly plasticized polymers. The polymer gel materials used as short term denture soft linings are blended with a variety of phthalate esters to lower the glass transition temperature. Work during the last three years has evaluated the leachability of plasticizers from a range of eight commercial materials. In addition the work has investigated the influence of volume of storage water on the leachability of plasticizers. The highest plasticizer leached by a material in 18 months was 79 mg/g. Typically materials leached 4 to 6% of the total plasticizer in the

original polymer gel over a period of six months. Selected materials leached some 11 to 15% of the total plasticizer in the original polymer over an extended period of 18 months. Leachability of esters were found to be significantly influenced by the volume of distilled water during storage. This was confirmed by analysis using gas chromatography as well as by radioactive assays of ¹⁴C labelled di butyl phthalate. The results provide for the first time long-term leachability data of these potentially cytotoxic compounds and clearly demonstrate the influence of the volume of storage water on the degree of leachability.



SMILE

Research Definitions

"It is believed that..." means:-
I think.

"It is generally believed that..." means:-
A couple of other guys think so too.

"Correct within an order of magnitude." means:-
Wrong.

Spectroscopy

Nigel P. Freestone has written an interesting account of the invention of spectroscopy by Robert Bunsen. In a fascinating letter dated 15 November 1859, the 'father of spectroscopy' Robert Bunsen described his researches to his lifelong friend and colleague, Sir Henry Roscoe:

At present [he said] Kirchoff and I are engaged in a common work which doesn't let us sleep...Kirchoff has made a wonderful, entirely unexpected discovery in finding the cause of the dark lines in the solar spectrum, and increasing them artificially in the sun's spectrum, and in producing them in spectra which do not have lines, in exactly the same position as the corresponding Fraunhofer lines. Thus a means has been found to determine the composition of the sun and the fixed stars with the same accuracy as we determine sulphuric acid, chlorine, *etc.* with our chemical reagents. Substances on the earth can be determined by this method just as easily as on the sun, so that for example, I have been able to detect lithium in twenty grams of sea water.

Gustav Kirchoff's mind was more speculative than Bunsen's and was familiar with the researches of Newton, Fraun-

hofer and Clausius. He showed Bunsen that instead of looking through coloured glass to distinguish between similarly coloured flames, he ought to use a prism to separate the light into its constituent rays. On this principle they developed the Kirchoff-Bunsen spectroscope, an instrument with revolutionised chemical analysis and became of supreme importance for the discovery of new elements.



- 13) You know you have a problem writing the paper when the title is longer than the discussion section.
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The Real World

"Most of the day-to-day business of science consists in making observations or experiments designed to find out whether this imagined world of our hypotheses corresponds to the real one."

Peter Medawar
