Dalhousie University, Faculty of Dentistry

Dental Research News

OCTOBER 1992

Research Development Office, (902) 494-1675

Stimulus & Challenge

The voice of Dal Dental research

VOLUME VI, NUMBER 10.

Research Productivity

This addition of the Research News highlights the number of abstracts presented at the AADR and IADR meetings. Few realize that Dalhousie is now the top performer in Canada in this activity. Our performance during 1992 was very impressive. The total of 42 abstracts at the two IADR/-AADR meetings is quite astonishing for the small size of our faculty. This does not take into account the educational research papers presented at the AADS meeting. Unquestionably we have an established and purposeful climate which is conducive to research and academic pursuits. However, we should of course not directly associate the numbers of research abstracts each year with the quality of research activity. Often such research will only represent preliminary data and as such requires consolidation and additional work, and is in many cases only a preamble or prelude to a full publication in a refereed journal or the submission of a research grant proposal. One encouraging and favorable aspect of this research performance is that it has been achieved at a time of economic constraint and at a time when we are also significantly improving our teaching program by developing a new curriculum.

==========

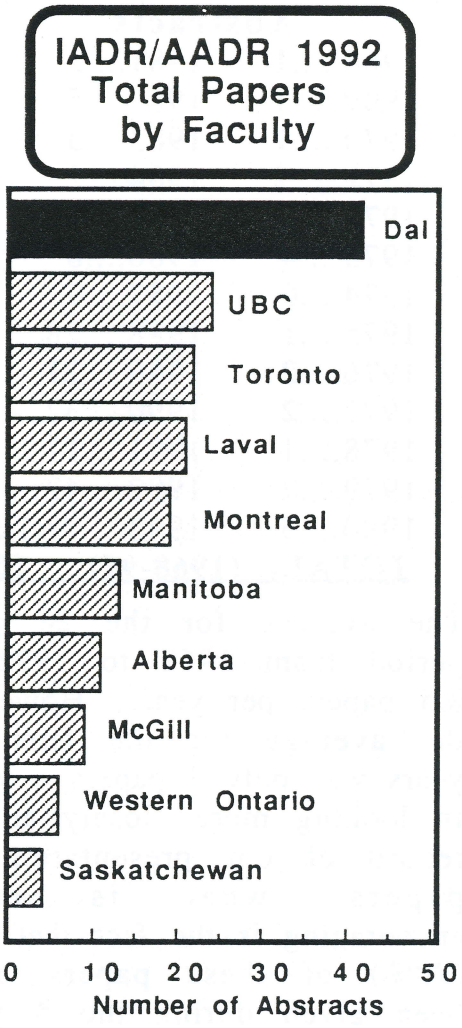
Not Unreasonable

"...., it is unreasonable to expect full-time clinical dental faculty, most of whom have large teaching loads, to engage in basic science research in "wet" laboratories where the research issues may be far removed from their everyday activities and interests. It is not unreasonable, however, to expect clinical faculty to collaborate in clinical research projects, since such activities are closely linked to their primary interests and skills."

Norman Mohl.

Dal Top of International Research

The performance of Dalhousie in terms of research productivity has been absolutely outstanding in the past year. At the AADR meeting in Boston in March a total of 58 papers from Canada were presented, 17 of these (29.3%) were from Dalhousie. At the June IADR meeting in Glasgow a total of 110 papers were from Canada, 25 (22.7%) of these carried the name of Dalhousie. The combined total for the two meetings for the Canadian papers was 168 out of which 42 (25%) carried the name of Dalhousie. Amazingly our Faculty had 18 more papers at the combined AADR/IADR meetings than the nearest rival UBC and 20 more than the University of Toronto. At the Boston meeting 1721 papers were presented 3.4% were Canadian and 0.99% were from Dalhousie, at the IADR meeting 5.6% were Canadian and 1.3% were from our Faculty. Few would have predicted ten years ago that Dalhousie would one day be the top Faculty in terms of abstracts presented at international research meetings. For so many years Toronto, UBC Manitoba and Alberta have dominated the scene. It is true that the abstracts presented at these meetings do not tell the complete story about the level of research, any more than the number of research dollars brought in. However, the number of abstracts presented each year does provide us with a crude measure of the health of the research in our institutions. Clearly the health of research at Dalhousie has never been better. How does it feel to be a member of the leading research Dental Faculty in Canada?



Further bar diagrams of the separate AADR and IADR papers presented by each Canadian Faculty are shown on page 7.

25th Anniversary?

Who will be the lucky person randomly sequenced in the IADR programme who will have the honour of presenting our 225th paper on the 25th anniversary of our first IADR paper? The historical listings of the numbers of papers presented each year are shown in the following table.

Dalhousie IADR/AADR Abstracts

1968.....1	1981....3
1969.....1	1982....5
1970.....1	1983....3
1971.....2	1984....2
1972.....3	1985....1
1973....4	1986....8
1974....0	1987....9
1975....1	1988....28
1976....2	1989....27
1977....2	1990....32
1978....1	1991....17
1979....7	1992....42
1980....5	1993....??(225?)

TOTAL, (1968-92) 207

The average for the 24 year period from 1968 to 1992 is 8.5 papers per year. However, the average for the first 20 years was only 3 papers a year. In looking more closely at the record of our presentation of papers, what is most encouraging is the fact that 144 (70%) of these papers have been given during the 5 year period following the establishment of the Dental Research Development Office. Our average for this 5 year period is a remarkable 28.8 papers each year, a record which many Canadian Faculties of Dentistry would be proud of. It should clearly be within our capability to have 18 papers accepted for the 1993 IADR Chicago meeting to allow us to reach the total of 225. As the leading faculty in dental research activity in Canada we have a reputation to keep up.

==========

The True Wish

"What we need is not the will to believe, but the wish to find out, which is the exact opposite."

Bertrand Russell.

==========

Research Expectation

"..... most universities require faculty to engage in some aspect of research or scholarly activity in order to create new knowledge, new methods, or new insights. Dental faculty are not exempt from this expectation. This imperative is increasing, and academic advancement will not be forthcoming unless evidence of scholarly activity is documented. Some may argue with this expectation, but we must recognize its history and rationale." Norman Mohl.

==========

Dens-fricare

"It is necessary to clean the teeth frequently, more especially after meals, but not on any account with a pin, or the point of a pen-knife, and it must never be done at table."

St. John Baptist de la Salle, The Rules of Cristian Manners and Civility, I 1695

==========

No Barrier to Research

Soft plasticized resin materials are used as adjuncts in the contemporary prosthodontic treatments of traumatized oral mucosa and atrophic residual alveolar bone. The tissue that lines the oral cavity is superbly constructed to fulfill its role as a barrier between the microbe-rich content of the oral cavity and the underlying connective tissues. However, the wearing of dentures can produce trauma which prevents this tissue functioning as normal. The epithelial lining, which is in a constant state of renewal, is composed of multiple layers, the top layer is shed periodically as a result of abrasion. The normal process is for morphological and biochemical changes to occur as cells are generated in the basal layer and move upwards to the top surface, this is a continuing process of cellular differentiation and eventual cell death. The process of stratified, squamous epithelial differentiation and desquamation combined with the variation in surface keratinization further complicate the requirements for soft polymer materials. In addition it is clear that the medical and dental needs and demands of the geriatric population are rapidly expanding. In the U. S. between 1960 and 1980 there was a 54% increase in the number of individuals over the age of 65. By the year 2,000 it is projected that this population group in the U. S. will have increased to over 35 million (U. S. Gov. Report, 1984). The general trend in age distribution in Canada is considered to be similar. Some form of slow-controlled drug release from biomaterials in both dentistry and medicine is an area which needs to be developed to help treat the diseases of an aging population. Such systems have the special potential for providing unattended health care treatment for populations in remote areas of Canada. Our biomaterials research aims to develop drug release systems from prosthodontic biomaterials. Ultimately, these methods and systems developed may have wider application and use.

Our research is concerned with developing soft polymer-gels capable of releasing drugs (such as antifungal agents and in the future possibly steroids) at different rates. We are synthesizing polymers having a range of Tg's [range of softness] to provide a strong starting point for development of drug carriers exhibiting a range of diffusion profiles. Some of the drugs chosen may actually function as plasticizers for the polymer systems. Computer modelling of plasticizer diffusion through mucosal tissue lends itself well to further application in the study of drug diffusion using a similar computer model. Studies may involve polymerizing a stable drug into the polymer

(Cont. on page 5)

(Cont. from page 4)
bead, as well as physically blending the drug into a soft polymer. These two methods may provide diffusion over both short— and long-term periods. Solvation rates are influenced by polymer molecular weight and polarities.

Infections with the yeast *Candida* have been reported for virtually every tissue of the human body. However, the most common manifestations of candidiasis are those which result in superficial lesions of the oral and vaginal mucosa. Antifungal agents containing mercury or arsenic are highly toxic and are not suitable for oral tissue application because of the potential for rapid systemic assimilation. The frequent occurrence of candidiasis in a high proportion of denture wearers complicates the utilization of soft polymers in the prosthodontic treatment and management of oral mucosa. The development of denture soft polymers capable of providing slow release of antifungal agents provides a possible solution to this problem. Nystatin has been used to inhibit the growth of *Candida albicans* on denture soft lining materials. In preliminary work we have investigated the incorporation of two antifungal drugs into a polymer; one of which will readily be released while the other is retained to prevent colonization by *Candida*.

SMILE

Statistical Definitions

The following definitions were found in a reputable book on statistics.

Autoregression: Thumb sucking in the family car.

Simple regression: Ordinary thumb sucking.

Step-wise regression: Thumb sucking in a street-smart kid.

Kolmogorov-Smirnoff test: Assay for the purity of vodka.

Double-blind trial: First date in a black-out.

Latin square: Roman in conservative garb.

Ordinal scale: Device for taking weights in the Vatican.

Serial dependency: Hooked on Rice Crispies.

==========

Nature

"Is it not, indeed, an absurd and almost a sacrilegious belief that the more a man studies Nature the less he reveres it? Think you that a drop of water, which to the vulgar eye is but a drop of water, loses anything in the eye of the physicist who knows that its elements are held together by a force which, if suddenly liberated, would produce a flash of lightening?"

- Herbert Spencer

==========

Crisis in Biomedical Research

The gloom which surrounds many research labs within the biomedical community at Dalhousie and across Canada due to the limitation in MRC funding is clearly a major problem. However, it is also clear that the problem is not confined to Canada, but is just as much a problem for our colleagues to the south. A paper by B. J. Clinton (Acad Med. 66:188-191 , 1991) titled "Shaping Science Policy: What's happening to Biomedical Research in America", is worth noting. In this paper Clinton stated "There is, scientists proclaim, a crisis in biomedical research. The crisis lies in the fact that the community's expectations now exceed any reasonable capacity to fund its projects. Between the late 1960s and now, the community has felt threatened many times: by the government leaders' and the public's perceptions of what basic science can produce; by such government initiatives as the "war on cancer," which steered funding to politically chosen areas of research; by changes in funding postgraduate research training; and by successive "crises" over the way NIH research funds are apportioned." Clinton further states that "None of these crises has resulted in the predicted dire consequences for the community, and the current one will not either. The challenge for the biomedical research community is to set priorities and allocate money accordingly." Like our US colleagues we have to accept that the doubling or even tripling the MRC budget would not fund all the good ideas produced by a greatly expanded body of researchers. Let us hope that the new MRC strategic plan with it's policies for allocating funds among individual investigators, institutions, and infrastructure will provide improved opportunities for those who have the drive and enthusiasm to sustain the struggle for research excellence.

Scientific Method

"....clinical research, because it encounters many confounding variables, must often pay more attention to the proper use of the scientific method and research principles than some basic research."

Norman Mohl.

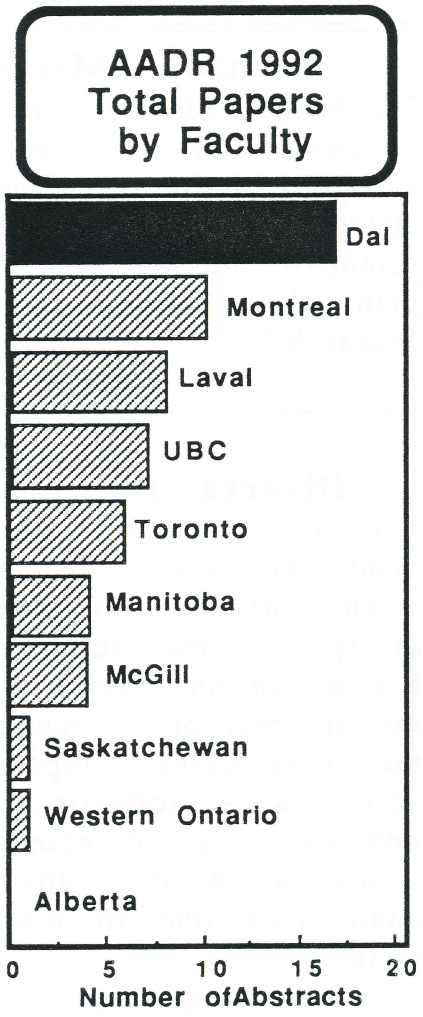
Diverse Disciplines

"In the scientist's house are many mansions. Not only does science divide into innumerable disciplines and sub-disciplines, but within any single discipline the progress of science calls for the most diverse repertoire of activities - activities are so numerous and diverse that it would seem that any person could find one to his or her taste."

Pat Langley et al.

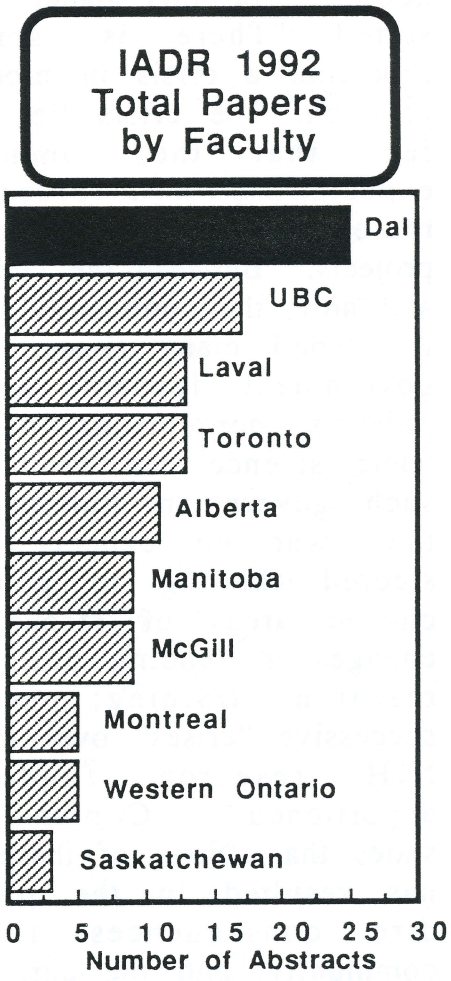
The 1992 Boston Meeting

The total abstract papers presented at the 1992 AADR meeting in Boston are shown in the bar diagram below. What is interesting is that the once mighty Toronto is ranked only in 5th place, and UBC are down at number 4. Alberta could not even manage a single paper at the Boston meeting. It should be noted that in compiling the data any paper which had more than one Canadian institution named would be counted twice, once for each institution.



The 1992 Glasgow Meeting

The total abstracts presented by faculty at the 1992 IADR meeting are shown below. Once again it is surprising to note that Toronto are languishing down at number 4. Some institution may have decided to only attend the IADR and to miss out on the AADR meeting in 1992. This could clearly explain the case for Alberta, who did manage to move into 5th position from not having any papers at the Boston meeting.



MRC Grant Submissions

The second week of September was a hectic time in the Dental Faculty, not only was it the start of a new term but it was deadline time for MRC grants to be submitted. One Major Equipment Grant and three Operating Grants were submitted from our faculty. The total projected budget request for the three to five year period was $955,654.94. The result of the reviews of these grant applications will be made known early in the new year.

Two of the grants were in the subject area of microbiology. The other two were in the area of biomaterials.

The titles of the grants were:

1) "Catabolism of Nitrogenous Compounds by key Periodontal Pathogens in Relation to their Genetic Diversity." by Dr H. N. Shah and Dr. R. L. White.

2) "Development of Electrical Bio-impedance Measurements to investigate the Physiological Properties of Fastidious Putative Periodontal Pathogens."
By Dr. H. N. Shah.

3) "Ceramic and Glass Biomaterials." by Dr's D. W. Jones, E. J. Sutow, B. Clarke and T. S. Cameron.

4) "Mechanical Testing of Biomaterials." -Major Equipment Grant from the Division of Biomaterials. This request is aiming to upgrade our servo-hydraulic mechanical testing machine. Strong letters of support have been obtained from colleagues in the Faculty of Medicine and the Health Professions.

Fifty percent of the individuals named on these grant applications come from the Faculty of Science, the other 50% are from the Faculty of Dentistry. It is important to note these collaborative efforts are being undertaken between the Faculty of Dentistry and Dr's White and Cameron of the Department of Chemistry and Dr. Clarke of the Department of Earth Sciences. The sharing of expertise and facilities is clearly an important consideration when competing in the highly competitive contest for research funding from the federal agencies. We have at least 955,654 reasons why this is a good idea. It should be remembered that these 4 applications 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, ability 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, and faculties.

Farewell to the Chief

The Dental Research News pays tribute this month to the efforts and inspiration for scholarship and research which has characterized Ken Zakariasen's term as Dean. Few Deans at Dalhousie in any Faculty, during the history of Dalhousie can claim to have presided over such a outstanding rise in research activity. Ken has clearly been an inspiration to our Faculty. Bertrand Russell once said, "What we need is not the will to believe, but the wish to find out, which is the exact opposite." Ken has encouraged us to develop the wish to find out.

Ken can look back on a period at Dalhousie with pride. A peroid in which amazingly over 50% of the total research funds obtained in the history of the Faculty of Dentistry from federal agencies have been realized in the short period April 91 to March 92. Twenty four years ago in 1968 the first research paper was presented by our faculty at an IADR meeting. In July 1992 we presented our 200th paper at the IADR meeting in Glasgow. This may not seem all that remarkable, however, it is amaizing to note that 144 (over 70%) of these papers have been given during the 5 year period of Dean Zakariasen's tenure from 1988-92. Our average for the 5 year period is a remarkable 28.8 papers each year, a record of which many would be proud.

Few of our faculty members have even realized that Dalhousie is now the top Dental Faculty in Canada in terms of research papers presented at international meetings. In 1992 our Faculty presented 25% of all Canadian papers given at these two meetings. Way ahead of our nearest rivals UBC and Toronto. This is the legacy that Ken Zakariasen leaves. The best parting gift to give to Ken will be to promise him that we will maintain our level of excellence as a top international research faculty. We should assure him, that all of his inspiration and endeavors directed to improving our research image internationally, will continue to flourish as a lasting memento to his efforts.

==========

AADS Research Statement

"Biomedical research is critical to the health of the nation. Both basic and clinical research have lead to improvements in oral health. Further improvements will be the result of continued efforts to produce new knowledge in the prevention and treatment of oral diseases. The Association believes that allocation of resources for biomedical research must receive a high priority".

American Association for Dental Schools, J. Dent. Ed 56:490, 1992.

==========

Obviously

"It requires a very unusual mind to make an analysis of the obvious."

-- Alfred North Whitehead