

The history of pharmacology in Canada

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Pharmacology training in Canada was initiated at McGill University in Montréal in 1824, and there are now 17 pharmacology departments in Canada offering graduate training to more than 500 students. In this article,

Gerald Marks reviews the growth of pharmacology in Canada since the early 19th century in both academic establishments and in the pharmaceutical industry.

The Pharmacological Society of Canada is the host of the XIIth International Congress of Pharmacology in Montréal this July. Hence, this is an appropriate time to assess the increasing strength of pharmacology teaching and research in Canada.

Pharmacology in Québec McGill University, Montréal

The Department of Pharmacology and Therapeutics at McGill University in Montréal can trace its origins to the year 1824, one year after the founding of the McGill Medical Institution. The department was initially called the Discipline of Chemistry, Pharmacy and Materia Medica, and after a succession of name changes, it was given its present name in 1887.

The following questions appeared in 1884 in the 'Materia Medica and Therapeutics' examination of the department:

'Describe the different methods of introducing mercury and iodine into the system for the treatment of syphilis. What untoward effects sometimes arise from the use of mercury? What is the best means to adopt to prevent the development of these effects? The untoward effects having set in, what would be your treatment?'

Will future generations look back and wonder at our present-day tentative methods to treat viral infections?

Some of the Chairs of the department are listed below:

(1) Andrew Holmes (1824–1835) produced the first publication of the department, the 'History of Cholera at Montréal'.

(2) Stephen Sewell (1842–1849) published the first paper in clinical pharmacology, which was entitled 'New and Important Therapeutic Use of Nux Vomica'². The active constituent of nux vomica was later identified as strychnine, and this paper provides a fascinating description of this agent in humans.

(3) William Wright (1854–1883) published a detailed paper entitled 'Calabar Bean'³, which appeared five years after the introduction of physostigmine, the active constituent of the calabar bean, into medicine.

(4) Henry Barbour (1921–1924) authored a book entitled *Experimental Pharmacology and Toxicology*⁴.

(5) Raymond Stehle (1924–1952), one of Canada's first biochemical pharmacologists.

(6) Kenneth Melville (1952–1967), an active researcher in cardiovascular pharmacology and among the first to show that adrenaline is not the sympathetic neurotransmitter.

(7) Mark Nickerson (1967–1975), internationally recognized for his discovery of the noncompetitive antagonist activities of phenoxybenzamine and other haloalkylamines, the concept of 'spare receptors' and the deleterious effects of vasoconstrictors in haemorrhagic shock. The department expanded considerably in 1967 under Nickerson.

(8) John Ruedy (1975–1978), a clinical pharmacologist, established a clinical pharmacology unit at the Montréal General Hospital. This became a centre for the training of clinical pharmacologists in Canada.

(9) Richard Ogilvie (1978–1983), a clinical pharmacologist.

(10) Claudio Cuello (1985–), an internationally known neuroanatomist and neuropharmacologist from Oxford University, UK.

Université de Montréal

Pharmacology in the Faculty of Medicine at the Université de Montréal originated as an academic entity in the Department of Physiology. Aurèle Beaulnes was appointed Chair of the Department of Pharmacology when it was established in 1959. In 1968, Gabriel Plaa, internationally known for his research on hepatic toxicology, was appointed Chair, and research and graduate teaching activities were expanded. The department expanded further in 1982 under the direction of Michel Côté when research facilities were located in affiliated hospital-based research centres. In 1991, André de Lean, renowned for his research on atrial natriuretic factor, was appointed Chair.

Université de Laval

Although Laval is one of Canada's oldest universities, it was only in 1962 that the Department of Pharmacology was founded. Corneille Radouco-Thomas came from Geneva to chair the department from 1962 to 1975. The department was subsequently chaired by Denis Gagnon (1975–1979), Alberta Nantel (1980–1982), and Simone Radouco-Thomas (1985–1990). The present Chair is Paul Bedard. During the past ten years, most Faculty members have moved to several hospital research centres where they work in multidisciplinary teams. A number of members of the department have been involved in the editorial activity of international pharmacology journals.

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Université de Sherbrooke

While Sherbrooke does not have a formal pharmacology department, there are several outstanding pharmacologists located at this school. Major contributions to peptide chemistry, biochemistry and pharmacology have emanated from a group directed by Domenico Regoli.

Pharmacology in Ontario

University of Toronto

The Department of Pharmacology and Therapeutics was established at the University of Toronto in 1887. James Thorburn, who had been trained in the then new science of pharmacology in Edinburgh, UK, was appointed as the first Professor. Thorburn was succeeded in 1890 by James MacCallum, a Toronto medical graduate who became acquainted with developments in local anaesthesia and autonomic pharmacology during postgraduate training in ophthalmology in London, UK. During his term as Chair, the name of the department was changed to *Materia Medica and Therapeutics*.

In 1907, MacCallum was succeeded by Velyien Ewart Henderson, who had trained in Germany and had worked with the notable experimentalist, Otto Loewi. Henderson initiated pharmacological research, and in 1919, restored the name to the Department of Pharmacology. He served as Chair until 1945, and appointed Frederick Grant Banting as a special lecturer in pharmacology. This appointment was for nearly six years and enabled the impoverished Banting to carry out his work with Charles Herbert Best that resulted in the discovery and purification of insulin⁵. Henderson's work with Easson Brown and George Lucas led to the discovery of cyclopropane anaesthesia.

Henderson was succeeded in 1945 by Ken Ferguson who encouraged colleagues to carry out studies on the pharmacokinetics of ethanol. In collaboration with several colleagues, he worked on the development of citrated calcium carbamide as a safer anti-alcoholism drug than disulfiram. This work on alcoholism and other forms of drug dependence has continued in the department without interruption and is now established as a major strength under the direction of Harold Kalant, Yedy Israel, H. Orrego and Edward M. Sellers. Edward A. Sellers, who was internationally known for his work on cold acclimation and on thyroid physiology, assumed the Chair in 1957. Under his direction, the department expanded and diversified.

Werner Kalow, who remains active in research, occupied the Chair from 1966 to 1977, and he and his colleagues are internationally known for their work on pharmacogenetics. Philip Seeman occupied the Chair from 1977 to 1987, and his group has established an international reputation in the field of dopamine receptors and their role in schizophrenia. Allen Okey, who is well known for his work on the role of cytochrome P450 systems in xenobiotic metabolism and toxicity, assumed the Chair in 1989.

The detailed lecture notes given to medical students has evolved into the production of the textbook, *Principles of Medical Pharmacology*⁶. In addition to the core department

on campus, a network of cross-appointed academic staff work in the Faculties of Pharmacy and Dentistry, the Clarke Institute of Psychiatry and clinical pharmacology groups based in a number of the major teaching hospitals.

McMaster University

The Faculty of Health Sciences was founded in McMaster University during the years 1966–1968 with a series of novel principles:

- (1) Medicine was to be taught as a completely integrated course, without separately identifiable components.
- (2) There were to be neither lectures nor examinations.
- (3) Learning was to be based on problems, and students were to take responsibility for their own learning.

Edward Daniel was recruited to McMaster from the University of Alberta in Edmonton. His smooth muscle research programme formed the foundation for pharmacological research and graduate teaching at the school. The MD programme was structured into six units and pharmacologists play a significant role in teaching in these units. Innovations in medical education at McMaster have had a widespread influence on medical education throughout the world (see this issue pp. 211–214).

University of Ottawa

The medical school at the University of Ottawa was founded in 1945. Maurice Murnagham, an Irish pharmacologist and physician, was recruited as Chair of the Department of Pharmacology in 1948, a post he held until 1964. George Ling served as Chair from 1964 to 1974, followed by Radhey Singhal (1974–1983). During these years, a graduate programme was developed and research facilities were expanded. After Paul Hagen had served as interim Chair (1983–1985), José Trifaro, internationally known for his research on adrenal gland pharmacology, assumed the Chair and the department was restructured and expanded. The graduate programme was also strengthened.

University of Western Ontario

The Faculty of Medicine at the University of Western Ontario was founded in May 1881, and a Chair of *Materia Medica* was established a year later. The Department of Pharmacology was founded in 1914. J. M. Crane served as Chair from 1915 to 1934, and was succeeded by Russel Waud, who served from 1934 to 1960. Charles Gowdey assumed the Chair in 1960 after completing a DPhil in Oxford with the noted chemical pharmacologist, H. R. Ing. Under Gowdey's direction, the department expanded and research was conducted in several fields.

The name of the department was changed to the Department of Pharmacology and Toxicology in 1980 to reflect increased interest in toxicology. Following the resignation of Charles Gowdey as Chair in 1980, Richard Philp served as Chair until 1986. John Bend was then appointed to the Chair after spending 16 years at the National Institute of Environmental and Health Sciences.

Following Bend's appointment, a major expansion occurred. Departmental strength has been enhanced by active cross-appointees and interactions with the Clinical Pharmacology Division in the Faculty of Medicine. The department has pioneered the teaching of an Honours BSc programme in pharmacology and toxicology and is now involved in a multi-departmental Honours BSc degree in toxicology with environmental sciences.

Queen's University

The Faculty of Medicine at Queen's University began accepting students in 1854. Fife Fowler, who obtained his MD at Aberdeen, UK, was appointed Professor of Materia Medica in 1854 at the age of 31. He taught materia medica to medical students for a period of 27 years, and was succeeded by Alfred Sales Oliver (1881–1890) and John Herald (1890–1904).

In 1904, J. W. Campbell was listed as Professor of Pharmacology within the Department of Medicine. Arthur E. Ross was appointed Professor of Pharmacy, Pharmacology, and Therapeutics in 1906, and remained in this position until leaving for active service as Brigadier General during World War I. In his absence, S. M. Asselstine served as Professor of Pharmacology. In 1924, Thomas Gibson, who had been educated at Edinburgh, UK, was appointed Professor of the Department of Pharmacology, Materia Medica, Pharmacy and Therapeutics. His research efforts were in the field of medical history and he published extensively on this topic in the *Canadian Medical Journal*.

Eldon Boyd was appointed as Professor and Head in 1938, and soon after his appointment, the department moved into improved facilities in the newly constructed Craine Building. He was the first to demonstrate the anti-emetic action of the phenothiazines. Furthermore, Boyd was a pioneer in Canadian toxicological research and was the first to demonstrate hepatic necrosis in mice following administration of large doses of acetaminophen. He was also the first President of the Pharmacological Society of Canada and a charter member of the Society of Toxicology of Canada. In 1969, Gerald Marks succeeded as Head. After his appointment, considerable expansion occurred, particularly after 1978 when the department moved to spacious quarters in the newly constructed Botterell Hall. Marks served as Head until 1988 when he was succeeded, first by Khem Jhamandas (1988–1993) and then by Kanji Nakatsu (1993–).

A recent major achievement at Queen's was the isolation and structural elucidation of atrial natriuretic factor by Aldolpho de Bold (pathology) and Geoff Flynn (biochemistry). This discovery was made in association with Harald Sonnenberg, from the Department of Physiology, University of Toronto.

Pharmacology in the Maritimes

Dalhousie University

The Department of Pharmacology in Dalhousie University, Halifax, Nova Scotia, began in 1938 as part

of a combined basic science department within the medical school, and materia medica was taught by physiologists and pharmacists. An independent Department of Pharmacology was initiated in 1949 under the direction of John Aldous who served as Chair until 1976. He initiated a PhD programme in 1959 and a pharmacology course for science students, which was an innovation at the time.

One of Canada's leading pharmacologists, Peter Dresel, assumed the Chair in 1976. Under his guidance, a number of outstanding young Faculty members were recruited, and the research base of the department was greatly expanded. His contribution to the development of the department is illustrated by the fact that the first three annual winners of the Merck-Frosst Medal in Pharmacology, initiated in 1987, were young pharmacologists from this department.

Peter Dresel was succeeded as Chair in 1988 by Kenneth Renton.

Memorial University

The medical school of Memorial University, Newfoundland, was founded in 1969. Pharmacology is part of the Basic Sciences Division of the Faculty of Medicine and does not exist as an independent department. Evert Vos, who is currently employed by Ciba-Geigy, Canada, was the first pharmacologist to join the Faculty in 1972. Chris Triggle, now Chair of Pharmacology at the University of Calgary, joined the department in 1973. Richard Neuman currently serves as Associate Dean of the Basic Medical Sciences Division. While the medical school does not offer a graduate programme in pharmacology, students that are interested in this subject can pursue a PhD as part of the neuroscience programme, which has a strong orientation towards pharmacology.

Pharmacology in British Columbia

The Faculty of Medicine was founded in Vancouver, British Columbia, in 1951. The Department of Pharmacology began in the same year under James Foulks as Head. In 1952, Edwin Daniel and George Drummond were recruited. Daniel left in 1961 to become the Head of the Department of Pharmacology at the University of Alberta, Edmonton, and Drummond became Head of the Division of Biochemistry at the University of Calgary in 1972. The first PhD graduate of the department, George Ling, later became Head of Pharmacology at the University of Ottawa in 1966.

Foulks was succeeded as Head by Morley Sutter, who retained his position until 1987. Michael Walker was Acting Head from 1987 to 1993 when Casey Van Breeman, internationally known for his work on smooth muscle and Ca^{2+} , became Head. In addition to its graduate programme, the department offers an Honours BSc and Major degree in pharmacology. In 1984, the name of the department was changed to the Department of Pharmacology and Therapeutics.

Table 1. Information on departments of pharmacology in Canada

Department name	City and Province	Current Chair	Numbers of research students and academic staff	Current areas of expertise
McGill University Department of Pharmacology and Therapeutics	Montréal, Québec	Claudio Cuello	MSc 12 PhD 33 Staff 18	Neuropharmacology Cardiovascular pharmacology Reproductive pharmacology Molecular biology
Université de Montréal Département de Pharmacologie	Montréal, Québec	André de Lean	MSc 57 PhD 40 Staff 14	Molecular pharmacology and cellular signalling Pharmacokinetics and drug metabolism Cardiovascular pharmacology Clinical pharmacology
Université de Laval Département de Pharmacologie	Ste-Foy, Québec	Paul J. Bedard	MSc 10 PhD 9 Staff 11	Cancer pharmacology Cardiovascular pharmacology Molecular pharmacology Neuropharmacology
Université de Sherbrooke Département de Pharmacologie	Sherbrooke, Québec	Pierre Sirois	MSc 33 PhD 20 Staff 6	Peptide pharmacology Leukotrienes and pulmonary disease Cardiovascular diseases Angiotensin and hypertension
University of Toronto Department of Pharmacology	Toronto, Ontario	Allan B. Okey	MSc 49 PhD 27 Staff 13	Alcoholism and drug addiction Drug metabolism and toxicology Neuropharmacology Pharmacogenetics
McMaster University Department of Biomedical Sciences	Hamilton, Ontario	P. K. Rangachari (contact person)	Staff 4	Smooth muscle pharmacology Neuropharmacology
University of Ottawa Department of Pharmacology	Ottawa, Ontario	José-Maria Trifaro	MSc 15 PhD 5 Staff 9	Neuropharmacology Cardiovascular pharmacology Molecular pharmacology Immunopharmacology
University of Western Ontario Department of Pharmacology and Toxicology	London, Ontario	John R. Bend	MSc 12 PhD 8 Staff 9	Cardiovascular pharmacology and toxicology Molecular pharmacology and toxicology Neuropharmacology and toxicology Clinical pharmacology and toxicology
Queen's University Department of Pharmacology and Toxicology	Kingston, Ontario	Kanji Nakatsu	MSc 19 PhD 17 Staff 9	Cardiovascular pharmacology Neuropharmacology Biochemical pharmacology and toxicology Mechanisms of resistance to anticancer agents
Dalhousie University Department of Pharmacology	Halifax, Nova Scotia	Kenneth Renton	MSc 10 PhD 10 Staff 11	Cardiovascular pharmacology Drug biotransformation and metabolism Molecular biology Neuropharmacology
Memorial University Division of Basic Medical Sciences	St John's, Newfoundland	Richard S. Neuman	MSc 5 PhD 8 Staff 2	Neuropharmacology
University of British Columbia Department of Pharmacology and Therapeutics Faculty of Medicine	Vancouver, British Columbia	Casey van Breeman	MSc 19 PhD 20 Staff 11	Cardiovascular pharmacology Neuropharmacology Biochemical pharmacology Clinical pharmacology
University of British Columbia Division of Pharmacology and Toxicology	Vancouver, British Columbia	Jack Diamond	MSc 9 PhD 12 Staff 8	Cardiovascular pharmacology Drug metabolism – cytochrome P450 Neuropharmacology Cyclic nucleotides Diabetes
University of Alberta Department of Pharmacology	Edmonton, Alberta	Ian L. Martin	MSc 8 PhD 15 Staff 21	Cardiovascular pharmacology Chemotherapy Central nervous system pharmacology Molecular pharmacology

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Department name	City and Province	Current Chair	Numbers of research students and academic staff	Current areas of expertise
University of Calgary Department of Pharmacology and Therapeutics	Calgary, Alberta	Christopher R. Triggle	MSc 5 PhD 8 Staff 6	Neuropharmacology Cardiovascular and smooth muscle pharmacology Toxicology Cancer
University of Saskatchewan	Saskatoon, Saskatchewan	Robert J. McNeill	MSc 8 PhD 10 Staff 8	Cardiovascular Neuropharmacology Cancer chemotherapy Pharmacokinetics
University of Manitoba Department of Pharmacology and Therapeutics	Winnipeg, Manitoba	W. Wayne Lauth	MSc 6 PhD 11 Staff 10	Cardiovascular pharmacology Clinical pharmacology and chemotherapy Liver pharmacology Neuropharmacology

The Faculty of Pharmaceutical Sciences at the University of British Columbia was founded in 1946, and the first classes in materia medica were taught by Dean Woods. In 1949, Jack Holliday was the first full-time pharmacologist to be appointed. He handled all pharmacology teaching for almost 20 years until the hiring of additional Faculty staff. The MSc and PhD programmes were initiated in 1958 and 1967, respectively. Research is a major focus of the department and all Faculty members are well known in their fields of research. Despite its small size, the Division of Pharmacology has produced two Presidents (Gail D. Bellward and John H. McNeill), two Secretaries (Sidney Katz and Bellward) and four Councillors of the Canadian Pharmacological Society over the last few years.

Pharmacology in Alberta

University of Alberta

The Department of Pharmacology at the University of Alberta began as an independent department in 1961 when Edwin Daniel moved from the University of British Columbia to head the department. Charles Nash and Norman Gillis, who had previously taught pharmacology as members of the Department of Physiology, moved to the newly formed Department of Pharmacology. Within five years, the department grew to ten Faculty members and research was carried out in a variety of areas. The graduate programme grew in parallel, and several of its graduates are now Faculty members and department chairs in Canada. Edwin Daniel was succeeded as Chair by John Charnock in 1972, who in turn was succeeded by David Cook in 1981. During David Cook's term as Chair, the Alberta Heritage Foundation for Medical Research was formed. This greatly aided the recruitment of new academic staff and the department grew to 20 Faculty members, four of whom have joint appointments with other departments. The influence of the department may be gauged by the fact that, of the Faculty members who have served in this relatively new department, 12 have moved on to other departments in Canada, the USA, New

Zealand, and Saudi Arabia, including six who became chairs or directors of departments. The present Chair, Ian Martin, was appointed in 1992.

University of Calgary

The Faculty of Medicine at the University of Calgary was initiated in 1970 with a non-traditional programme that emphasized transdisciplinary teaching and research. The Division or 'Department' of Pharmacology did not follow the usual pattern with responsibility for pharmacology teaching and research. Keith MacCannell served as Chair from 1970 to 1975 and was succeeded in 1975 by Gary Van Petten. A number of excellent new academic staff arrived in the mid-to-late seventies. Morley Hollenberg, who is renowned for his work on ligand-receptor interactions, was appointed Chair in 1979. At this time, the Alberta Heritage Foundation for Medical Research was formed. Funding from this source allowed the Faculty to double during the next decade and new research areas were established. Chris Triggle was appointed Chair in 1989. The excellence of research in this department is attested to by the receipt of the prestigious Upjohn Award by two of its Faculty members, the late George Drummond in 1984 for his work on the cAMP system, and Karl Lederis in 1990 for his work on the peptide urotensin 1.

Pharmacology in Saskatchewan

The School of Medical Sciences was established at the University of Saskatchewan as a two-year pre-clinical school, and physiology and materia medica were taught in the university's green houses. In 1946, the Department of Physiology was renamed the Department of Physiology and Pharmacology. Louis Jacques, noted for his research on heparin, was appointed Head, a position he held until 1969. The cornerstone of the 'new' medical building was laid by Premier Tommy C. Douglas, who later became a household name for his introduction of a universal health care system in the province that

was later to serve as a model for a nationwide system in Canada. The College of Medicine was established in 1952 with medical students taking pharmacology in their second year. The first full-time appointment of an Assistant Professor of Pharmacology was made in 1965 when Robert Hickie was appointed. In the same year, Denis Johnson was appointed Assistant Professor of Physiology and Pharmacology. In 1969, the official separation of the Departments of Pharmacology and Physiology occurred, and the Department of Pharmacology was established with Robert Hickie and Denis Johnson acting as Acting Co-Chairs. In 1973, Gordon Johnson was recruited as Chair, and considerable expansion occurred. Graduate studies and research were strengthened and innovative new ideas were introduced into the teaching of medical students as well as continuing medical education of physicians. Gordon Johnson resigned as Chair in 1986 and was succeeded by Denis Johnson. Johnson assumed the position of Associate Vice-President of the university in 1992, and James R. McNeill, internationally known for his research in cardiovascular pharmacology, was appointed Chair.

Pharmacology in Manitoba

As in many Faculties of medicine in the 1950s, Pharmacology and Therapeutics existed as a section in the Department of Physiology. The Head of the Department of Physiology at the time, the legendary Joe Doupe, encouraged the Faculty to create a separate Department of Pharmacology and Therapeutics. Mark Nickerson, internationally known for his studies of adrenoceptors, was recruited as Head, with revolutionary effects on the department. A number of outstanding academic staff were recruited, in particular, Peter Dresel, George Frank, Ian Innes, Frank Labella and Ivan Bihler, and a flourishing graduate programme was established. In addition to his many scientific attributes, Nickerson was able to secure funds to build a state-of-the-art research building in 1965, the Chown Building, which was the envy of the rest of the medical Faculty at the time. By the time Nickerson left for McGill University in 1967, the department in Winnipeg had become the powerhouse of Canadian pharmacology, producing a succession of excellent graduates, several of whom became chairs of pharmacology departments in other parts of Canada. Nickerson was succeeded as Chair in turn by Ian Innes and Clive Greenway. Wayne Lutt is the current Chair.

The pharmaceutical industry in Canada

Only a small amount of basic research has been carried out by the pharmaceutical industry in Canada, although this situation has been improving in recent years as government legislation has changed to create more favourable conditions. Prior to 1982, when Ayerst, McKenna and Harrison (a division of Home Products) moved its Montréal-based research laboratories to the

USA, it was a major centre of pharmaceutical research in Canada. Conjugated oestrogens (Premarin) was one of the products developed as a result of a collaboration between workers at McGill University and this pharmaceutical company. The major player in pharmaceutical research in Canada, at present, is Merck-Frosst which has a Centre for Therapeutic Research in Montréal, employing many outstanding pharmaceutical scientists. The research emphasis has been on leukotrienes, and arising from this research, an anti-asthmatic drug is now undergoing clinical trials.

Increasing sums of money are being provided by the pharmaceutical industry for joint projects with university researchers. A good example of such a co-operative venture is the establishment by Glaxo and the Alberta Heritage Foundation for Medical Research of a unit dedicated to research on antiviral drugs at the University of Alberta in Edmonton. This unit, headed by David Tyrrell, has been developing antiviral drugs for treatment of hepatitis B. One of their drugs, a product of Canadian research in Montréal, is now undergoing Phase III clinical trials in several countries. The Medical Research Council (MRC) of Canada is establishing a joint programme with the pharmaceutical industry to fund co-operative MRC and industrial research.

Concluding remarks

Further information on the academic departments of pharmacology in Canada is provided in Table 1. Research in pharmacology is also carried out in many federal government laboratories in Ottawa and in pharmacology divisions in veterinary and pharmacy schools throughout Canada.

Canadian scientists have played a role in the discovery of some important drugs. For example, Robert Noble, working at the University of Western Ontario, London, and researchers at Eli Lilly, Indianapolis, screened 60 complex chemicals in the leaves of the rosy periwinkle plant and identified the anticancer properties of vinblastine and the related anticancer drug vincristine, respectively. Furthermore, timolol, a β -adrenoceptor antagonist, was introduced into therapeutics by research scientists working at Merck-Frosst in Montréal.

The invitation to the Pharmacological Society of Canada by the IUPHAR to host the XIIth International Congress of Pharmacology in Montréal in July this year testifies to the development of the field of pharmacology in Canada. It is our hope that the Congress will serve as a stimulus to our younger scientists and result in great achievements in the future.

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