Recombinant DNA: designer genes

Anderson Lookin

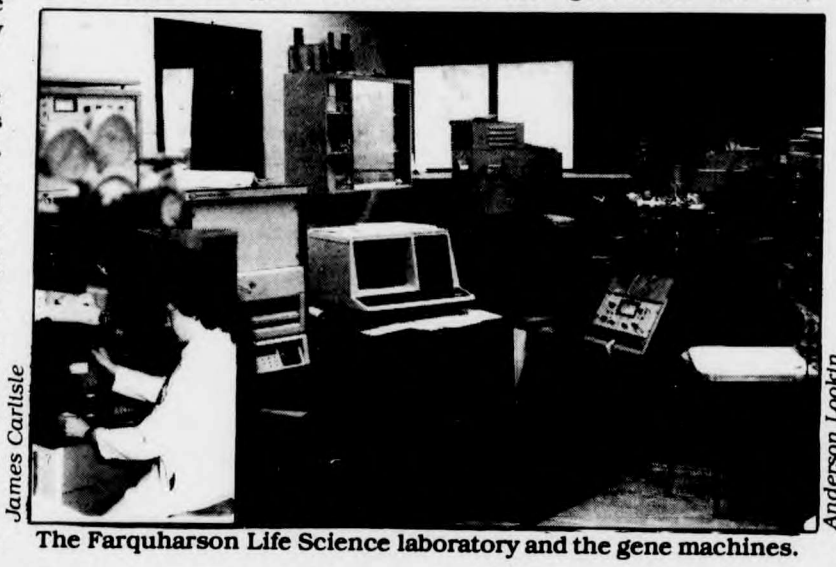
Like the old saying goes, "there is a lot more to the York University's Biology department than that which meets the eye of a typical York student." In the Farquharson Life Sciences building or more specifically the laboratory of Dr. R. Pearlman of York's Department of Biology a massive effort is being put into the study of the structure and functions of genes using recombinant deoxyribonucleic acid (DNA).

massive effort

These experiments used in an attempt to unravel the secret behind what determines the physical characteristics of any living organism.

Deoxyribonucleic acid, more often referred to as DNA, is hereditary material, the basic, fundamental building block responsible for physical appearance. A DNA molecule consists of two strands of atoms which carry a special sequence of the four nitrogen bases; thymine, cytosine, adenine, and guanine. Each different permutation of these four bases literally holds the 'code' (the genetic information about the cells) of life within them. The information is read off the DNA molecule as a ribonucleic acid or RNA molecule which acts as a template in the synthesis of protein. These proteins are what ultimately determine the physical characteristics but it all leads back to the DNA molecule.

Recombinant DNA is a DNA molecule made up of specifically arranged atoms coming from more than one species. The biologists at York University are using recombinant DNA technology in an attempt to study the details of how genes in cells are organized and how they function. This area of research is so new that, "every answer brings forth a new set of questions, scientists have only begun to learn about the gene and its properties," yet the dedicated and conscientious scientist persistently continues and is destined to achieve another milestone or breakthrough comparable to the discovery of the Double Helix in 1962.



James Carlisle

Anderson Lookin

The Farquharson Life Science laboratory and the gene machines.

Today biologists are capable of rearranging the sequence of the nitrogen bases through the process of molecule isolation and chemical systhesis. This could result in the creation of a new DNA molecule which may not exist in nature. Yet even with this ability scientists are not capable of creating entirely new organisms. In fact it is debatable whether geneticists are even interested in creating new life forms. As a matter of fact much of the recombinant DNA technology is being applied to the industrial aspects of Biotechnology.

genetic engineering

The commercial aspects of the recombinant DNA technology is refered to as Genetic Engineering. This industry is presently experiencing the rapid growth similar to that of the microelectronics industry in the mid-seventies. Moreover it is destined to become a major focus of future scientific efforts. These techniques show an immense potential to produce important products such as insulin, growth hormones and interferon far more efficiently than the present methods of production. Hence, the immense benefits resulting from genetic research are obvious.

Despite the many attractive yields that are available, the study of recombinant DNA is still in its infancy. York University's Biology department is a pioneer in this area of science where very few participants exist. As they continue to train and produce the highly skilled personel vital to this field, York University is making an investment which is certain to have a profitable return.

Canadian Student Pugwash—science of life

A symposia series on "Technology and Human Life" was held on campus this past month by the Liberal Science Programme and Canadian Student Pugwash, a new student group which seeks to interest students in ethical issues in science and general matters of concern between science and society.

The first symposia was titled "Defense Technology: How we get new weapons systems, their strategic implications and effects on prospects for arms control and world peace". Jim MacIntosh of the Political Science Department explained that there is no easy answer to the questions suggested in that title because the military research and development (R & D) system is complex. He compared defense and military policy to a big bus with 20 different steering wheels; for the bus to change direction, everyone must steer the same way at once. To confound matters, every four years there is a new chief driver in the U.S. bus.

Norman Alcock, who is President of the Canadian Peace Research Institute compared the magnitude of increase in the destructive potential and delivery capability of weapons systems since the Second World War with the way of thinking of the military leaders, which has changed very little. The "Toxic Chemical Waste in the Environment" lecture featured three speakers. Colin McArthur (Department of Chemistry, and Director of Liberal Science Programme, York University) gave an introduction to the chemicals of concern and their possible health hazards. A very moving documentation of the worries associated with toxic chemical wastes was given by Fran Sanisbury, a spokesperson from the Concerned Citizens of Stouffville group. People in Stouffville fear that an industrial chemical waste dump still in use in their area may be leaking dangerous materials into their water supply. In an area running west and downhill from the site there is a miscarriage rate four times the national average and a seemingly high rate of cancer. Colin MacFarlene from the Waste Management Branch of the Ontario Ministry of the Enviornment spoke on municipal and agricultural wastes as well as industrial wastes, and pointed out differences in the perspectives we have of the danger involved in different hazards. Sam Madras of York's Chemistry Department, acted as moderator for a short but lively question and discussion period.

The final session, "Communications Technology: Economic, Military and Sociocultural Ramifications", began with an introduction by Arthur Siegal (Dept. of Social Science). Paul Medow (Dept. of Economics) addressed the economic and military aspects through a discussion of cybernetics, which studies the effects of hierachical administrative links and thus takes into account how systems are controlled. Arnold Rockman (Dept. of Sociology, Atkinson College) discussed a number of sociocultural impacts of communications technology in Canada, such the neglect of "horizontal" applications in favor of "top-down vertical" approaches.

More Pugwash activities are being planned for next term. For further information, contact Rod Brittain, 667-6026.

Steacie Library hours temporarily reinstated

Wanda Kamocki

Once again the effects of financial cutbacks are being felt at York University. This time, the Steacie Library and its users are the victims.

In September cutbacks forced early evening closure of the library. Students soon began to realize the consequences of these changes and decided that something had to be done to remedy the situation. At this time the York Physics Society became involved in the fight to have early library closure re-evaluated and they have been temporarily successful. In this case the limited supply of funds has not been the main or direct issue, but rather, the fair allocation of the funds that are available.

Steacie hours had been cut by thirteen per week. Science students feel that the facilities at Steacie have always (been) less than adequate with respect to space and quantity of reference material, and reduced funding has further hindered the efficiency of Steacie. Above and beyond the slashed hours, the hiring of part-time staff (usually students), the people responsible for keeping shelves in order has been impaired. There are too few staff members to keep the library running smoothly. But, once again, the Scott Library has not been affected by such reductions.

Dr. W.J. Megaw, Chairman of the Department of Physics, contacted the director of Libraries, Anne Woodsworth, regarding the Steacie situation. In her reply Ms. Woodsworth assured Dr. Megaw that attempts had been made to be fair when considering how to reduce the overall library spending, and that the hours cut from Steacie were those during which there was little use of the library.

"Short of printing money with which to hire full-time staff or casual staff," Woodsworth added, "I see little hope that Steacie can be kept open as long as Scott beyond the end of the current fiscal year."

Despite this explanation many science students feel there are other alternatives. One student suggested that, "by closing both libraries at eleven thirty p.m. Monday to Friday, the total number of hours cut would be almost the same as presently, and surely it can't cost as much to run Steacie for half an hour as it does to run Scott!"

Members of the Physics Society spoke to Dr. O.R. Lundell, Dean of Sciences, to inquire as to why he had agreed to the cutbacks at Steacie (the reply from Anne Woodsworth stated that both he and the director of the Steacie Library, Brian Wilkes, had okayed the changes. Lundell admitted that he had been unaware of the seriousness of the problem and he promised to speak with Woodsworth about extending the library hours during exam periods, and possibly during other times as well.

Within two days Lundell had managed to attain the extended hours requested for Steacie during the Christmas exam period from December seventh to the twenty-third. The library will be open now from Monday to Friday until midnight, however, it will be available on a reading-room basis only, that is, no books may be signed out after ten-thirty from Monday to Thursday and after five on Friday. The reasoning behind this detail remains unclear. What is clear is that how extensively the library is used during the exam period with the extended hours will have a great part in determining what will happen in the second term; whether or not the hours will be extended once more on a permanent basis.

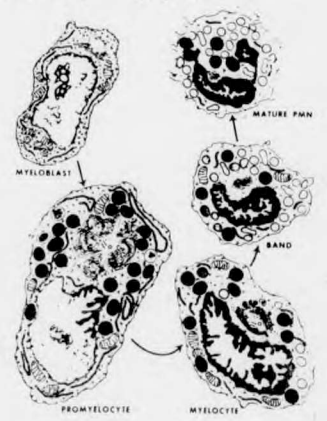
SCIENCE MILESTONES

by

STEACIE SCIENCE LIBRARY

Dec. 6, 1778 Joseph Gay-Lussac was born. He contributed to the understanding of the properties of gases.

Dec. 7, 1810. Theodor Schwann was born. He established the modern theory of cell biology, coined the word 'metabolism', and isolated the first enzyme, pepsin.



Dec. 11, 1843 Robert Koch was born. As a founder of modern bacteriology, he created basic methods for isolating, growing, and studying bacteria.

Dec. 12, 1901 Gugliemo Marconi sent the first wireless signal across the Atlantic Ocean.

Dec. 14, 1911 Roald Amundsen reached the South Pole.

Dec. 15, 1852 Gustav Eiffel was born. He was the engineer responsible for the contruction of the Eiffel Tower.

Dec. 17, 1778. Sir Humphrey Davy was born. He was the first to use electric current to separate metals from their compounds. He isolated and named sodium, potassium, and magnesium.

Dec. 17, 1903 The Wright brothers made the first successful airplane flight from Kitty Hawk.

Dec. 18, 1856 Sir J.J. Thomson was born. He proved the existence of the electron and explained many of their properties.

Dec. 19, 1852 Albert Michelson was born. He. determined the velocity of light with apparatus sufficiently accurate to establish the fact that the velocity of light is an unvarying constant.

Dec. 23, 1900 Canadian Reginald Fessinden transmitted the first wireless voice message over a distance of one mile.

Dec. 24, 1818 James Joule was born. Through many brilliant experiments he established that a amount of heat is produced when a given amount of work is converted to heat.

Dec. 25, 1642 Sir Isaac Newton was born. He established the theoretical foundation of classical physics.

Editor's note: References to Newton's birth occur on Christmas day in both Julian and Gregorian calendars, indicating the esteem that scientists give this individual.

Dec. 27, 1822. Louis Pasteur was born. He propounded the germ theory and invented pasteurization againt communicable diseases.

Dec. 28, 1895 Wilhelm Roentgen announced his discovery of X-rays.