

New assay will help discover cancerous cells

Five years of research into a new method of detecting carcinogens have paid off for York professor John A. Heddle and his research team at the Ludwig Institute for Cancer Research.

Dr. Heddle, who is Head of Genetics at the Ludwig Institute, is returning to York in April having made a singularly important contribution to the detection of cancer causing agents.

"Our new assay is a big thing. All previous tests required cells which were dividing and forming colonies. Now ours can detect mutations in non-dividing cells. The assay is adaptable to any

cells of the body whether or not they can grow into colonies," said Heddle.

He attributes high North American cancer rates to cigarette smoking and factors related to our diet. Although there are hotspots in the environment whose chemical contents directly affect human health, he believes the majority of cancers are caused by some component in the foods we consume in our daily bid to survive.

"The majority of human cancers are environmental but (generally) are not related to industrial chemicals," said Hed-

dle, but he admits, "In some industries there are workers who are affected."

The colon is a major site of cancer in the western world whereas in Japan and many developing countries the age-specific rates are much lower. In studies of migrant populations, where a group moves from a low cancer rate location to a high rate location, the population assumes the cancer rates of their new environment. This rate is identical to that of the population at large; therefore, genetics have been eliminated as a factor in the cancer rate.

Mortality from cancer of the colon has been positively correlated to the consumption of some foods and nutrients. Meats appear to be a contributing factor in cancer and the consumption of cereals seems to afford some protection.

Biological in vitro assays, which use the growth of bacterial colonies to detect carcinogenic and mutagenic substances, have been very successful in detecting and classifying environmental contaminants, to detect occupational hazards and to screen drugs and other man-made chemicals.

But these tests do not take into account the uptake, distribution, metabolism and excretion of chemicals within the more complex human body.

"The results probably don't reflect the intact human

response," said Heddle, discussing the complexities of the human mechanism. "We are much more complex with different chemicals activated and inactivated (all the time)."

Better results can be obtained by using in vivo techniques which involve the extraction and nurturing of bone marrow or sperm cells and then exposing them to the chemical agents requiring testing.

While the tests are accurate for the specific cell type under study, the results cannot always reliably be assumed to be true for other types of cells.

"In vivo assays involve a particular site, for example, bone marrow tissue which is easy to handle. But carcinogens are tissue specific. For colon cancer we must look in the colon, for breast cancer we must look in the breast," said Heddle.

Until now, the assays depended on a rapidly multiplying cell population and so were useless on a cell type which could not be coerced to multiply outside its natural environment.

Heddle, along with his research team, has developed a new assay technique which promises unrivaled accuracy because it is not dependent on cell division for its results.

Basically, diphtheria toxin kills mammalian cells. It does this by interfering with the protein synthesis process of the cell. If normal cells are exposed to diphtheria toxin they die, but if the cells have undergone certain gene mutations owing to exposure to a mutagen or carcinogen, the cells

must become resistant to the D-T toxin and do not die.

It is this characteristic which forms the basis of Heddle's new assay and it promises to be a cell specific and a more accurate representation of the effects of carcinogens and their interaction with body metabolism.

The interpretation of the results relies on autoradiographic techniques. A solution which contains radioactively labelled leucine is added to the cell mixture after it has been exposed to the D-T toxin. The mutated cells which have survived take up the labelled amino acid and incorporate it into their structure as they continue to live.

If the cells are spread on a microscope slide which has been coated with a photographic emulsion, the radioactive decay of the labelled leucine exposes the emulsion. It is subsequently developed in a manner similar to that of a common negative. When viewed with a magnifier the mutated cells stand out clearly from the background and can be accurately counted. The more survivors, the more mutated cells, and that means the agent being tested is strongly mutagenic.

The development of this highly accurate test has implications for all of the human community. It has been recognized that dietary factors are a major contributor to our high cancer rates and with this new assay technique we will eventually determine the components of our diets which are harmful.

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First holder to be announced soon

Grant completes Robarts Chair funding

A grant from the province of Ontario has completed funding for the endowment of the Robarts Chair in Canadian Studies, and John Lennox, Acting Director of the Robarts Centre for Canadian Studies, says the first holder of the Chair is to be announced soon.

The provincial grant was for a sum of \$400,000, matching equal amounts raised by the private sector and by the federal government.

George Bell, Vice-President (External Relations and University Development), explains that \$200,000 of the provincial grant has been contributed for the purpose of completing the \$1 million endowment for the Robarts Chair, while \$200,000 goes towards a planned \$1.2 million endowment for research programs.

"This completes the first goal of our fundraising for the Centre—the Robarts Chair—and starts on the second phase, to fund research on a continuing basis," Dr. Bell says.

The Robarts Chair is an integral component of the Robarts Centre for Canadian Studies, established in November 1982 to sponsor, coordinate and public-

ize research in the area of Canadian Studies. It is named for the late John P. Robarts, former Ontario premier and former York chancellor.

Acting director of the Centre John Lennox is extremely pleased with the provincial contribution and the completion of the endowment for the Chair. He says the first holder is to be announced shortly.

"It's like a door opening upon a whole range of possibilities," he says.

"The Chair will enhance the reputation of the institution for work in the Canadian Studies field, and is a complement to our proven strength in Canadian research scholarship."

"The whole York community can take pride in this," he adds.

Prof. Lennox explains the Chair will be offered annually to a distinguished scholar who will focus research on an issue of national importance. The incumbent of the Chair will participate in several seminars, workshops or colloquia and will culminate his or her tenure with the Robarts Lecture.

Dr. Bell notes the campaign to raise funds for the Robarts Centre is ongoing, with the view to

reaching approximately \$5.2 million. As well as the \$1 million endowment for the Robarts Chair and \$1.2 million endowment for research, a one-time capital fund of approximately \$3 million is needed to construct facilities.

Prof. Lennox stresses the importance of further fund raising.

"This is but the completion of the first stage of ongoing fund raising efforts. Our efforts cannot stop at this," he says, pointing out the research endowment will be directed into three crucial areas: the establishment of post-doctoral and doctoral fellowships; the establishment of faculty research fellowships; and the provision of grants-in-aid for the publication of work done at the Centre.

The Centre will serve as a focus for the extensive amount of Canadian study under way at the University. Very significant work in many disciplines places York at the forefront in Canadian Studies.

The Robarts Centre has not been idle while waiting for endowment money. The inaugural conference in May, 1984 (opened by then-premier William Davis) featured distinguished York scholars from a variety of disciplines speaking on concerns of Canadian society.

A reading by French-Canadian author Roch Carrier was held in September, and two research colloquia are being held: on February 26 Professor Frank Davey of the English department spoke on "Data Base Applications in Canadian Literary Research"; and on March 14 presentations and discussions on "Science Policy in Canada" are being held by members of York's Faculty of Science.

The Centre is also co-sponsoring the Canadian Cultural series.



Fine Arts professor Leon Major works with students in a third-year scene study class. Prof. Major, who joined York's Theatre Department last September as co-artistic director of the graduate program, is one of Canada's best-known theatre directors. Founder and for five years general director of the Neptune Theatre in Halifax in the 1960s, he moved to Toronto Arts Productions at the St. Lawrence Centre for 10 years. Prof. Major also does a scene study course with a graduate class and has a weekly seminar with four graduate student directors, and he recently directed *La Ronde*, a performance by graduate theatre students.

Senate committee investigating academic implications of strikes

The Senate of York University has established a Special Committee with the following mandate:

1. investigate the general impact of the recent strikes on the academic standards of the University;
2. obtain from Deans and Departmental Chairpersons reports, which shall not identify specific courses or instructors, on the effect of these strikes on the academic programs under their jurisdiction; and
3. prepare recommendations on how adverse academic effects of strikes might be minimized in the future.

The Committee invites all members of the York University community to comment on the academic implications of recent strikes. Correspondence should be addressed to David Thompson, Secretary, Special Committee on the Academic Implications of Recent Strikes, Room S945, Ross Building. The deadline for submissions is March 14, 1985.