



# StemSpecs

Volume 2, Issue 2 July, 2006

Welcome to the latest issue of StemSpecs, the on-line newsletter of “Mass Spectrometer-based Flow Cytometer, Methods and Applications”, a Genome Canada project launched in February 2005. This issue features a biography of Mark Minden - the leader of the clinical leukemia team.

Since our last issue, Toronto has played host to a number of meetings relevant to project participants as well as to the greater research community. In June we had the yearly meeting of the StemSpec project's International Scientific Advisory Council. The Council members were updated on the project's progress over the past year, and they offered many valuable suggestions. The 20th Anniversary of Dr. John Dick's Laboratory this summer prompted the reunion of a large group of stem cell researchers whose careers began under Dr. Dick's guidance. Toronto was also the setting of a successful conference of the International Society for Stem Cell Research (ISSCR).

Our website is intended to inform readers of the goals and structure of our project and to acquaint you with the multidisciplinary team that is doing this work. If you haven't seen the site, please have a look, starting from our homepage: <http://www.uhnres.utoronto.ca/studies/stemspec/>. We hope that you will find the website informative, and that you'll check back to follow our progress.

Welcome to StemSpecs!

Sincerely,  
The Editors

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## Biography: Mark D. Minden



Dr. Mark Minden, leader of the clinical portion of the Stem-spec project, is continually searching for ways to improve treatment of his leukemia patients. The role of the Minden lab in this project is to put a human face on what the group as a whole is trying to accomplish: to develop technologies that enable personalized therapy.

Dr. Minden is one of those seldom-encountered individuals who are able to bridge the gap between the research

laboratory and the clinic. In his position as Head of the Leukemia Program at Princess Margaret Hospital (PMH), Dr. Minden is heavily involved in patient care and bone marrow transplantation. He does this while maintaining an active research laboratory at the Ontario Cancer Institute (OCI) which studies how normal, healthy blood cells switch to a diseased state.

Mark was born in Baltimore, MD and grew up in Hamilton, Ontario. He received a B. Sc. (Med.) from the University of Manitoba, where he had performed research in the laboratory of Dr. Lionel Israels. In 1974, Mark graduated from Medicine at the University of Toronto. As a second-year intern in internal medicine, Mark began studying human leukemic cells in the laboratory of hematopoiesis research pioneer Dr. E. A. McCulloch. Upon comple-

tion of his Ph.D., Mark furthered his training in oncology and molecular biology at Harvard and the Massachusetts Institute of Technology. Returning to Princess Margaret Hospital in 1981, Mark established his own laboratory for leukemia research.

As both a senior scientist and staff physician at OCI/PMH, Dr. Minden investigates how basic scientific discoveries can be applied to leukemia treatment. Over the years he has been involved in drug sensitivity studies and identification of the molecular mediators of drug resistance. Another important area of research in the Minden lab has been to study the factors that influence growth of acute myeloid leukemia (AML) cells.

One of the Minden group's key contributions to the leu-

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### ***Did you know?***

Leukemia is divided into 4 major categories according to the cell type affected and the speed of disease progression. Myelogenous and lymphocytic leukemia can each occur as acute or chronic forms.

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kemia research community is the development and maintenance of an AML cell bank. For every leukemia patient that enters PMH/OCI, blood samples are collected and preserved, with detailed clinical information about each patient linked to the sample.

Access to the AML cell bank means that the Stemspec project can go even further than its already ambitious goal of building an instrument and reagents for highly multiplexed proteomic analysis. Testing of samples from patients with well-documented clinical histories will permit correlation of diagnosis and outcome. This is an important validation of the methods being developed in the project.

The availability of tools to routinely measure many factors simultaneously will permit more refined classification of disease. Because diagnosis will be based on a more thorough understanding of the cause of the ailment, it will be easier to customize therapy for each individual patient.

The way Mark describes it,

*“We’re gaining more understanding of cell defects and how to modify them, so that treatment is no longer a shotgun approach, but more like an arrow aimed at a specific target.”*

## The John Dick Lab: Celebrating 20 Years of Research

This year marked an important milestone: the 20th anniversary of the establishment of Dr. John Dick’s laboratory.

To celebrate this event, a 20th Anniversary Alumni Symposium was held on June 28, 2006 at the MaRS Centre, the new site of Dr. Dick’s laboratory. Former members of the Dick Lab travelled to Toronto from their current homes in locales as varied as Paris, London, Madrid, Israel and Japan.

Sessions were organized chronologically according to “generations” of lab members, loosely representing various phases of the Dick Lab’s existence. Former students and

postdoctoral fellows described their current research in informative and entertaining presentations.

A telling sign of Dr. John Dick’s impact is that so many have continued to work in research. Numerous successful careers have been built upon the solid scientific foundations gained in his lab. Some have gone on to investigate in more depth certain aspects of hematopoiesis and leukemia, including the role of migration in stem cell development, stem cell mobilization as a method to improve bone marrow transplantation, and retroviral or lentivi-

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Dr. John Dick (right) with his Senior Research Technician of 20 years (and counting) Monica Doedens (left) and his first graduate student Wayne Chang (centre).

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A feeling of camaraderie has endured in the Dick Lab throughout its existence. It was brought to the fore during this gathering, and will surely continue as new members join the group in the years to come.

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ral transduction of stem cells. Others have transferred their skills to exploring non-hematopoietic systems, such as olfactory cells in the nasal cavity (responsible for the ability to smell) and pancre-

atic stem cells (which may one day provide breakthrough diabetes treatments).

But perhaps the most valuable parts of the presentations were the personal touches: comical stories,

interesting insights, and tales of lessons learned during their time in Toronto. It was clear that John's former trainees enjoyed the opportunity to reminisce. The anniversary celebrations have undoubtedly added another page (or two) to the memory books.



### ***Did you know?***

Humans produce as many blood cells in one day as cats do in 8 days, and as mice do in their entire lifetimes (Abkowitz JL *et al.*, Proc Natl Acad Sci USA 92, 2031-5, 1995).

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## Hosting the World's Stem Cell Biologists

From June 29 to July 1, 2006, close to 2000 stem cell researchers from all over the world converged in Toronto, Canada as the city hosted the 4th Annual Meeting of the International Society for Stem Cell Research (ISSCR).

The ISSCR is an independent, non-profit organization whose purpose is to promote and foster the exchange and dissemination of information and ideas relating to stem cells. Every year the ISSCR organizes an international meeting of stem cell biologists. This year's ISSCR Program Chair was our very own Dr. John Dick. The Program Committee's hard work in organizing the meeting was evident throughout the busy program of seven plenary sessions, three concurrent sessions, three poster sessions, Meet the Experts breakfasts, and a Job Fair.

The conference opened with a

welcome by Dr. Alastair Glass, Ontario's Deputy Minister of Research and Innovation. Dr. Glass expressed the province's support for scientific research, explaining that such fundamental work is key to economic growth.

A highlight of the meeting was the Presidential Symposium honouring Dr. James Till and Dr. Ernest McCulloch, co-discoverers of the hematopoietic stem cell. The keynote speaker for this session was Dr. John Polanyi, 1986 Nobel laureate in Chemistry and University Professor at the University of Toronto. Dr. Polanyi urged researchers, from students to laboratory veterans, to pause in their daily routine to think about their responsibilities to Science as well as to Society.

The 105 presenters from 15 countries spoke about a wide range of current topics in stem

cell research, such as the role of the stem cell niche, regulation of cell fate by microRNA, and epigenetic control of lineage commitment.

### *Are Tiny MicroRNAs the Next Big Thing?*

Researchers have unveiled a fascinating new class of regulatory elements. MicroRNAs, or miRNAs, are naturally occurring RNA molecules that are only 20-22 nucleotides in length. Because they are so small and hence difficult to detect, they remained out of sight and unappreciated until recently.

For years, many geneticists considered the "non-coding" sequences between genes to be evolutionary leftovers, with no biological function. Far from being the products of "junk" DNA, microRNAs are in fact highly conserved. It is estimated that there are hundreds of distinct microRNAs. Each species binds to the 3'-untranslated sequences of specific mRNA transcripts, preventing protein synthesis.

Studies of microRNA expression profiles in stem cell development were discussed in several presentations at the ISSCR meeting. The question no longer appears to be whether microRNA regulatory networks influence leukemic progression, but rather how extensively they do so.

## Ladies and Gentlemen, We Have a Winner!



Outstanding posters at the ISSCR conference were recognized with Junior Investigator Poster Awards. Among this year's winners was Dr. Eric Lechman, a post-doctoral fel-

low in Dr. John Dick's lab. His poster entitled "Micro-RNA Ex-

pression Profiling in Distinct Acute Myeloid Leukemia Subpopulations: A Role for miR-155/BIC in Regulating the Leukemogenic Program" provided compelling evidence that specific micro-RNA species influence AML cell development.

Congratulations Eric!

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