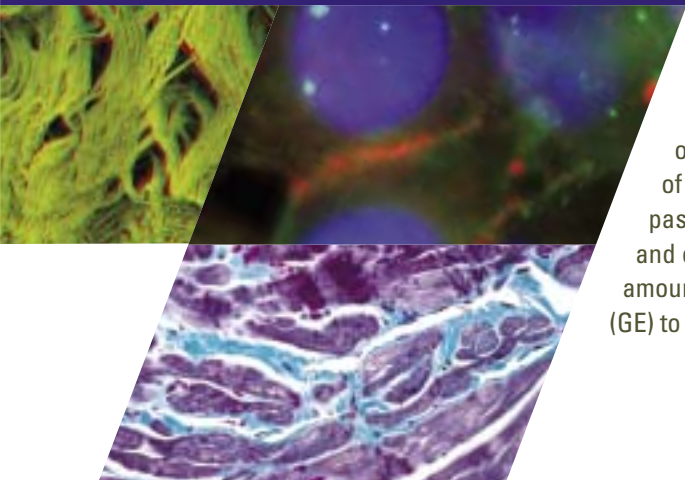




How you want to be treated.



The iCAPTURE Centre's Organ Pathophysiology and Imaging Core has benefitted from a state-of-the-art CT scanner and a powerful Magnetic Resonance Image (MRI) machine purchased with dollars from the Canada Foundation for Innovation (CFI) and partners. iCAPTURE investigators can now non-invasively test their hypotheses in patients. (l-r, Dr. Hogg, Dr. Mayo, Dr. Müller, Dr. Coxson)



DELIVERING THE NEXT GENERATION It was a satisfying year for Dr. James C. Hogg and his team who celebrated the publication of their latest research in the *New England Journal of Medicine*. This paper offered conclusive new information about the causes and factors underlying the progression of Chronic Obstructive Pulmonary Disease (COPD). Dr. Hogg, with an eye for developing the next generation of iCAPTURE researchers, lured Dr. Harvey Coxson, his former graduate student, back to iCAPTURE. In the past year, Dr. Coxson and his colleague Dr. John Mayo have discovered an important link between anorexia and emphysema. Using Computed Tomography (CT) scans, they demonstrated that malnutrition reduces the amount of available lung tissue. The group is also working closely with electronics giant *General Electric* (GE) to create software to make the research measurements a part of every CT scanner.

iCAPTURE *delivers*



Dr. Peter Paré, Director and Dr. Bruce McManus, Co-Director

SPECIAL DELIVERY— Message from the Directors

iCAPTURE delivered a solid return on investment throughout the fiscal year April 1, 2003 to March 31, 2004. After a relatively brief infancy during which we expanded our infrastructure and partnerships, growth and maturation are on course for our people, our space, the technologies, team capabilities and research results. Our efforts to attract further competitive funding have been successful. Total funding (including all CFI infrastructure awards) for this fiscal year was \$ 9,037,022.

The most dramatic growth for The James Hogg iCAPTURE Centre for Cardiovascular and Pulmonary Research is in our human resources. In addition to building our managerial staff, our investigators work daily with our increasing complement of students and trainees. iCAPTURE is now home to 30 principal investigators and more than 220 staff and trainees.

Over the past year, these people have delivered impressive results extending our current Canadian Institutes of Health Research (CIHR), Canada Foundation for Innovation (CFI), and Canada Research Chair awards. Based on earlier successes, our investigators continue to receive individual grants as demonstrated in this report. Additionally, our facility has been co-awarded a \$9.1 million Genome Canada project entitled Better Biomarkers of Acute and Chronic Allograft Rejection with investigators from the Vancouver Coastal Health Research Institute. This project will use the most advanced genomic, proteomic and bioinformatic tools to discover and validate a sensitive and specific blood test for liver, heart or kidney rejection in transplant patients.

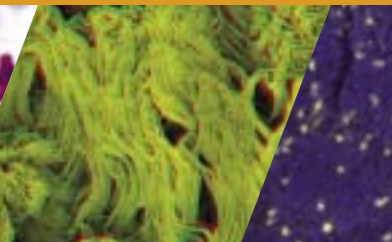
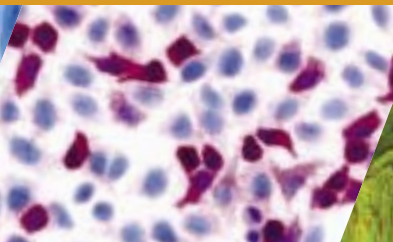
Since iCAPTURE's December 2003 official opening, research has proceeded at an accelerated pace and the facility continues to expand. We secured additional investigator offices to accommodate new recruits and created a dry laboratory for statistics and bioinformatics. Our facility now nears 50,000 square feet.

The growth of iCAPTURE has created unimagined opportunities for circulatory and respiratory research at Providence Health Care and UBC. We are proud to have built an open environment where people embrace the vision of improving patient care — and where the horizons are pursued through the power of creative teams. The future looks very promising.

With warm regards,
Peter and Bruce

DELIVERING ON OUR STRATEGIC PLAN

In 2002, iCAPTURE developed a long-term strategic plan to frame and support our progress. This year, we continued to implement our strategic plan through these long-term working groups.



DISCOVER Delivering research results continues to be the primary focus of all investigators, trainees and staff. In 2003/04 we experienced dramatic growth in our research output, both in terms of papers published and presented as well as in the impact of this research on health.

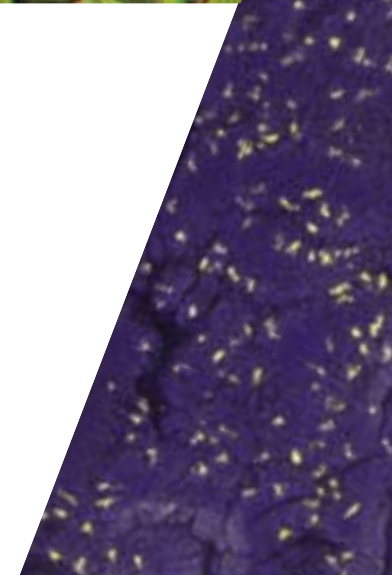
TRANSLATE The agenda of the translation team was ensuring that the stretch from research to prevention, prediction and treatment remained a priority for all of us. Drs. Walley and Russell are currently developing a method using DNA sequencing to determine which drugs will best aid a patient's recovery in the ICU. This work exemplifies our goal.

SYNERGIZE This team sought to understand how to encourage synergy by developing a survey to identify the multidisciplinary research needs at iCAPTURE. The results of this survey will drive our future steps towards a transdisciplinary culture.

ATTRACT Concrete ways to retain our existing people and attract new stars were developed by the "attract team." These included a formal acknowledgement system and a graduate student society (The Society of Fellows). They also focused on team-building events including a winning Dragonboat team called iCAPSIZE and fundraising pub nights.

COMMUNICATE This team piqued public interest in iCAPTURE through media attention (over 65 media stories since early 2003) and outreach activities. They also implemented our Communications Strategy including overhauling our printed materials. Projects currently underway include an updated website, attracting students to assist with scientific animation, and additional outreach to Providence staff.

SUSTAIN Hard at work, the sustain team wrote an application to renew infrastructure funding, implemented a pre-review to increase our CIHR success rate, developed CORE business plans for fee-for-service technology, and increased industry sponsorship with Novartis, Merck and IBM collaborations and QLT contracts. They also expanded iCAPTURE funding pools with higher CIHR indirect payments and departmental overheads.





DELIVERING KNOWLEDGE

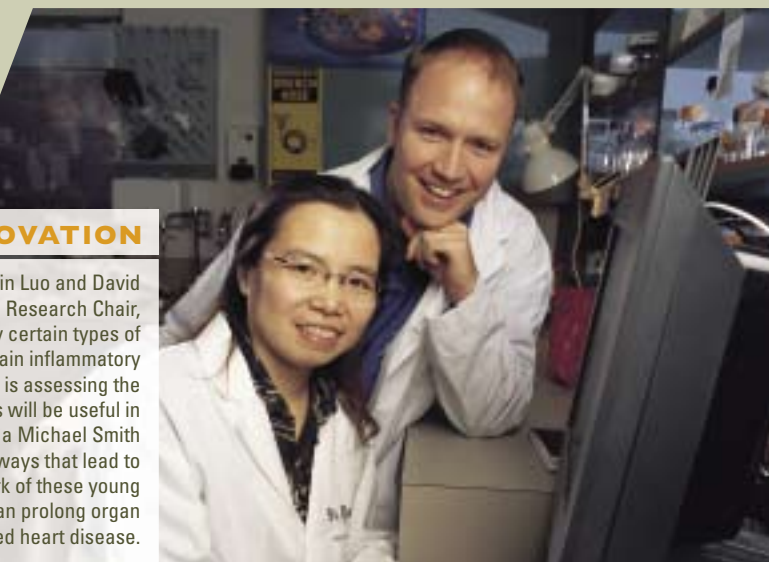
Computing, bioinformatics and knowledge management hold the key to advances in human health research, something Drs. Mark Wilkinson and Don Sin predicted long ago. Dr. Wilkinson is the creator of the BioMOBY Project, an Internet-based service that helps researchers find and use data they need to conduct quality research. He is currently working on standard international cardiovascular and pulmonary diagnostic language as well as a computer-assisted analysis tool to process iCAPTURE-generated data. Dr. Sin, a respiratory specialist, clinical epidemiologist and Canada Research Chair is trying to better understand the relationship between Chronic Obstructive Pulmonary Disease (COPD) and cardiovascular complications. His work relies on large population data sets and analysis of associated DNA sequences as well as blood proteins. He believes that he can answer critical health questions by examining these large, diverse datasets. Thanks to the computing power in iCAPTURE systems, these pioneering researchers will continue this work as well as facilitating the research of all iCAPTURE investigators.

Drs. Don Sin and Mark Wilkinson use state-of-the-art technology purchased with CFI dollars

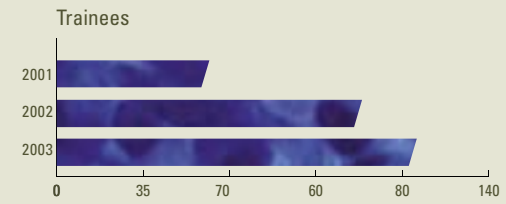
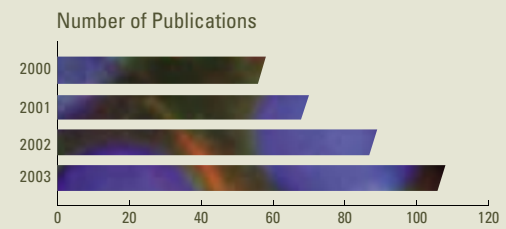
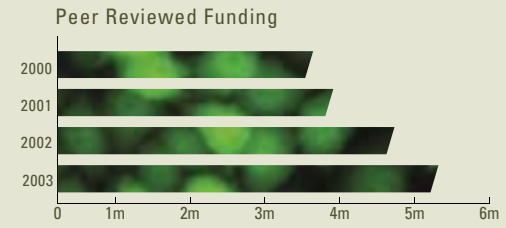


DELIVERING INNOVATION

A new generation of iCAPTURE investigators including Drs. Honglin Luo and David Granville, are solving the mysteries of cell signaling. Dr. Granville, a Canada Research Chair, and his colleagues have demonstrated that a cytotoxic enzyme released by certain types of immune cells may be a key player in the onset and progression of certain inflammatory heart and vascular diseases. Based on this knowledge, Dr. Granville is assessing the possibility that certain proteins capable of blocking cell death pathways will be useful in treating heart attacks and heart transplant rejection. Dr. Honglin Luo, a Michael Smith Foundation for Health Research Scholar, is investigating the pathways that lead to virus-mediated injury of the heart muscle. Together the innovative work of these young investigators will lead to the development of novel treatments that can prolong organ survival following transplantation and reduce virus-induced heart disease.



Drs. Honglin Luo and David Granville represent the new generation of iCAPTURE investigators



DELIVERING MAJOR AWARDS AND GRANTS

iCAPTURE investigators have been successful in competing for a number of awards in 2003-04. A full list of grants and awards is available on our website. Here are some highlights:

- **Drs. Bruce McManus** and VCH investigators **Paul Keown** and **Rob McMaster** received a \$9.1 million Genome Canada award, entitled Better Biomarkers of Acute and Chronic Allograft Rejection
- **Dr. David Granville** was awarded a CIHR New Investigator Pilot Project
- **Drs. Honglin Luo, David Granville** and **Andrew Sandford** received Michael Smith Foundation for Health Research Scholar Awards
- **Dr. Keith Walley** received a Michael Smith Foundation for Health Research Distinguished Scientist Award
- **Dr. Bruce McManus** received the 2004 Makoto Nagano Award from the International Academy of Cardiovascular Sciences for lifetime achievement and leadership, and the UBC Killam Research Prize in the Senior Science category
- **Drs. Hayashi, Hegele, Knight, Mahmudi-Azer, Tebbutt** and **He** were awarded BC Lung Association Research Grants
- **Drs. Peter Paré** and **Mahmudi-Azer** received a highly competitive award from the American Thoracic Society
- **Drs. Granville, van Breemen** and **Yang** were awarded CIHR three year operating grants and **Drs. Denise Daley, Kuo Hsing Kuo** and **Xiaoning Si** were awarded CIHR Postdoctoral Fellowships
- **Drs. Ryon Bateman** and **Sanjay Manocha** were awarded Michael Smith Foundation for Health Research Postdoctoral Fellowships
- St. Paul's Hospital Foundation Pilot Project award recipients include doctoral candidate **Patricia Camp** and **Drs. Dorscheid, Hill, Luo, Podor** and **Wilkinson**
- James Hogg iCAPTURE Centre Pilot Project Award recipients include **Drs. Bai, Knight, Chan, Hill, Granville, Luo, Hegele, McManus, Frohlich, Mayo, Russell, Seow, Paré, Schellenberg, Sin, Man, van Eeden, Podor, Walley, Dorscheid, Tebbutt** and **Wang**

DELIVERING PARTNERSHIPS

We wish to thank our current partners:

American Thoracic Society
Amgen
BC Knowledge Development Fund (BCKDF)
BC Lung Association
Canada Foundation for Innovation (CFI)
Canada Research Chairs
Canadian Institutes of Health Research (CIHR)
Centre for Molecular Medicine and Therapeutics (CMMT)
General Electric (GE)
Genome British Columbia
Genome Canada
GlaxoSmithKline
Heart and Stroke Foundation of BC and Yukon
IBM
Merck Frosst Canada
Rosetta
Michael Smith Foundation for Health Research
National Institutes of Health (USA)
Novartis
Providence Health Care, St. Paul's Hospital
QLT, Inc.
Scios, Inc.
St. Paul's Hospital Foundation
University of British Columbia

DELIVERING THE FUTURE

As our programs evolve, we will continue to focus on research that improves the health of patients with heart, lung and blood vessel diseases. To meet the challenge we will:

- Attract the rising stars in cardiovascular and pulmonary research
- Expand our dry laboratory space
- Focus on data integration and analysis
- Garner additional grants and awards
- Facilitate knowledge translation to the community
- Formalize our Standard Operating Procedures (SOPs) for use of all common equipment and laboratory procedures
- Take time to imagine research horizons of the future
- Continue to enhance our enthusiastic team-building efforts—and have fun!

PRIVATE SUPPORT OF OUR RESEARCH

Tragically, heart, lung and blood vessel diseases combined are still the world's number one cause of death and disability. iCAPTURE has been extremely successful at attracting infrastructure grants and government research dollars, but attracting funds to allow us to retain our expertly trained staff and purchase new equipment remains a challenge. We encourage corporate, private and individual donors to look into our research and our capabilities with the help of the St. Paul's Hospital Foundation (604.682.8206 / 1.800.720.2983 / www.helpstpauls.com) or the UBC Development Office (604.682.8900 / 1.877.717.GIVE).

iCAPTURE = Imaging, Cell Analysis, and Phenotyping Toward Understanding Responsive, Reparative, Remodeling, and Recombinant Events

James Hogg iCAPTURE Centre for Cardiovascular and Pulmonary Research

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growth

future

health

innovation

dream

18 MICROSCOPIC IMAGES
 (Left to right, top to bottom)

1. Cellular response to TSG1 requires E3 ubiquitin and the nuclear envelope of intermediate cells through E3a ubiquitin in the absence of E3b (James C. Hogg)

2. Collaborative cardiomyocyte death in adult Drosophila heart and Drosophila embryo (Tom Fodor and Bruce Alexander)

19 SMALL VESICLES
 (Left to right, top to bottom)

1. Fatigue cells infidelity of cell cycle in vivo in embryonic stem cells and mouse brain (Chang-Hsin Lee)

2. See in heart muscle from embryonic stem cells: the importance of all genes (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

5. Fluorescent image of heart

5. Fluorescent image of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

4. 3D SEM of isolated artery

4. 3D SEM of isolated artery (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

6. Microarray of heart

6. Microarray of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

9. Fluorescent image of heart

9. Fluorescent image of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

8. Cellular response to toxic

8. Cellular response to toxic (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

11. 3D SEM of isolated artery

11. 3D SEM of isolated artery (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

12. Interleukin-10

12. Interleukin-10 (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

13. Fluorescent image of heart

13. Fluorescent image of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

14. Microarray of heart

14. Microarray of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

15. Fluorescent image of heart

15. Fluorescent image of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

16. Microarray of heart

16. Microarray of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

17. DNA and RNA

17. DNA and RNA (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

18. Microarray of heart

18. Microarray of heart (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)

19. 3D SEM of isolated artery

19. 3D SEM of isolated artery (Chang-Hsin Lee, Tom Fodor and Bruce Alexander)