

MOLECULAR ONCOLOGY & BREAST CANCER PROGRAM

BCCA CANCER RESEARCH CENTRE

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Our Research Focus:

The Molecular Oncology and Breast Cancer Program is a new program of the BC Cancer Agency created in April 2005. It is bringing together clinicians and researchers across the province interested in breast cancer research. The nascent program compasses research programs focused on elucidating the molecular and genetic mechanisms underlying key clinical problems in cancer, such as resistance to chemotherapeutic agents and the mechanisms by which cancer arises. Our goals are to use this knowledge to target prevention, early detection, molecular diagnostics and therapy. The department's basic and translational research programs in breast, pediatric and ovarian cancer are supported by cutting edge technology platforms such as genome-wide siRNA screens and mouse genetic models.



Key Research Staff:

<i>Researcher name</i>	<i>Position & Cross-Appointments</i>
Samuel Aparicio MD, PhD	Head, Molecular Oncology Senior Scientist Nan & Lorraine Robertson Chair in Breast Cancer Research Canada Research Chair in Molecular Oncology Professor, Pathology and Laboratory Medicine, UBC
Poul Sorensen MD, PhD	Senior Scientist Johal Endowed Chair in Pediatric Oncology Basic and Translational Research, UBC Professor, Pathology and Laboratory Medicine, UBC
Peter Watson MD, PhD	Senior Scientist Director, Tumour Tissue Repository, VIC Senior Scientist, Deeley Research Centre, VIC Pathologist, VIC Adjunct Professor, Biochemistry and Microbiology, UVic Professor, Pathology and Laboratory Medicine, UBC

Training

A.) Course Instruction

P Sorensen UBC Medical Genetics 421

B.) Summary of Trainees

Total No. of Current Students	Post-doctoral	Post-graduate	Undergraduate	Clinical
16	8	6	2	-

C.) Current Students - Degrees Completed

Name	Supervisor	Date Completed	Awards/Honours Received
MSc			
C Cooper	P Watson	2005	Master's
PhD			
B Rotbat	P Sorensen	2006	PhD
E Emberley	P Watson	2005	PhD

D.) Trainee Awards

Name	Supervisor	Award Received
Angela Beckett	S Aparicio	NSERC – Canada Graduate Scholarship 2006
Leah Prentice	S Aparicio	MSFHR Junior Graduate Studentship (2005-2006)
Jenny Potratz	P Sorensen	Deutsche Krebshilfe Scholarship
Fan Zhang	P Sorensen	CIHR Doctoral Research Award (2006-2008)
Tony Ng	P Sorensen	CIHR Canada Graduate Scholarships – Masters (2006-2008)
Joana Gil	P Watson	Portuguese Foundation for Science and Technology
Josh Wang	P Watson	MSFHR Post Doctoral Scholarship (2006 – 2008)

Current Awards and Honours

Name	Distinguished Award/Honour
S Aparicio	Canada Research Chair in Molecular Oncology (2005-2010)

Select Current Contributions

Name	Membership/Committee Involvement
S Aparicio	Member, NCIC Panel H Grant Review Committee
	Member, NCI Research Panel
P Watson	Member, DOD Cell Biology Review Panel
	Member, Alberta Cancer Board, Review Panel

Current Research Projects²

1. Beyond the estrogen receptor: Involvement of kinases in estrogen dependence and independence in human breast cancer	
<i>PI: LC Murphy (U Manitoba)</i> <i>Co-I: P Watson</i> CIHR \$120,143 (2005,2006) \$839,100 (2000-2009)	Targeting the ER pathway using tamoxifen is useful to treat breast cancer, but are ultimately limited due to the development of resistance in many tumours. Our goal is to characterize a novel inhibitor of ER activity.
2. Canadian Tumour Repository Network CTRNet	
<i>PI: BA Schacter</i> <i>Co-I: V Ling, P Watson et al.</i> CIHR	For description see Vancouver Island Centre
3. Centre for molecular pathology	
<i>PI: S Aparicio</i> <i>Co-I: D Banerjee, R Gascoyne, D Horsman, D Huntsman, A Karsan, P Sorensen</i> CIHR \$190,384 (2006) \$951,920 (2006 – 2011)	Creation and future maintenance of the Vancouver Centre for Molecular Pathology/Centre for Translational Genomics (CTAG) a collaborative technology platform in genomics and functional genetics to support translational research in the field of molecular pathology.
4. CRC chair in molecular oncology	
<i>PI: S Aparicio</i> CRC \$72,000 (2005) \$72,000 (2006) \$360,000 (2005-2009)	The progression towards cancer invariably requires multiple molecular events to occur. Our current experimental models mimic only one or two events occurring. These are insufficient to fully understand the development of cancer. This program will construct multiple event models in rodents and human cells, initially focusing on the interactions between growth factor and other molecules.
5. METABRIC – Molecular taxonomy of breast cancer international consortium	
<i>Co-PI: S Aparicio</i> <i>Cancer Research UK</i> \$1,700,000 (2006 – 2009) (<i>to be held in the UK</i>)	The major goals of this project are to study 2000 breast tumours, using a combination of high resolution array-CGH, expression profiling and TMA analysis, and correlate the molecular profiles obtained with the clinical outcome of the tumours.
6. Molecular pathways influencing progression of early breast cancer	
<i>PI: P Watson</i> <i>Co-I: LC Murphy, RPC Shiu</i> CIHR \$127,790 (2005) \$127,790 (2006) \$575,055 (2003-2008)	For a project description see Vancouver Island Centre

² Key to abbreviations: PI = Principal Investigator, Co-I = Co-investigator; CIHR* = Funding Institution; \$150,000 (2005-2007) = Total Project Funding for Given Years (*see pages 16-17 for a list of acronyms)

7. Prostate Centre's translational research initiative for accelerated discovery and development	
<p>PI: M Gleave (Prostate Centre) Co-PI: S Aparicio CFI/ RHF (CFI-Innovation Fund) \$19,239,950 (2005-2009)</p>	<p>The goal is to create a fully integrated, multi-disciplinary cap research facility to further accelerate discovery of biomarkers and biologic therapies, improve public awareness or research, increase clinical trials activity and facilitate seamless transfer of interventions to promote regional growth of biotechnology.</p>
8. Role of the IGFs and type 1 IGF receptor in pediatric solid tumours	
<p>PI: P Sorensen CIHR \$115,764 (2005) \$115,764 (2006) \$655,708 (2001-2010)</p>	<p>The goal is to understand how a particular cellular pathway, called the insulin-like growth factor 1 receptor (IGF1R) axis is involved in many pediatric malignancies and adult cancers. We hope to identify how this signaling axis may be uniquely activated in transformed cells but not in normal cells, and therefore how it might be targeted therapeutically, using an oncogenic protein called ETV6-NTRK3 as a model system. In pediatric cancer, ETV6-NTRK3 has a striking dependency on the IGF1R axis for the survival of malignant cells. We will directly analyze how IGF1R contributes to survival of malignant cells and determine what effects IGF1R blockade may have on tumour growth.</p>
9. Studies into the tumour suppressor activity of the HACE1 E3 ubiquitin-protein ligase	
<p>PI: P Sorensen NCIC \$140,107 (2006) \$700,535 (2006 – 2011)</p>	<p>Dr. Sorensen's team is studying a gene that is known to be altered in the cells of certain childhood cancers. They plan to discover how this gene works in order to find new ways to treat these cancers. The team believes that the Hace1 gene normally blocks the unfolded protein response. As a result, if Hace1 is altered in a cancer cell, it loses the ability to block this mechanism and the cancer cell is more likely to survive. They have discovered that cells without normal Hace1 genes contain high levels of a protein called Hsp70, which has also been linked to cancer. They will now determine the effects of lowering Hsp70 levels in these cells to see whether the Hace1 gene's activity is associated with the Hsp70 protein and learn more about how it works.</p>
10. The estrogen receptors in human breast cancer	
<p>PI: LC Murphy (U Manitoba) Co-I: P Watson CIHR</p>	<p>For a project description see Vancouver Island Centre</p>
11. Transformation pathways of the oncogenic ETV6-NTRK3 tyrosine kinase	
<p>PI: P Sorensen PI: V Evdokimova CIHR \$538,987 (2003-2008)</p>	<p>The goal is to analyze how ETV6-NTRK3 – discovered in childhood cancers as a result of specific chromosomal re-arrangements – turns off tumour suppressing signaling pathways, how it forms large protein complexes as part of its signaling mechanism, and how it might regulate the production of specific proteins involved in growth and survival of tumour cells.</p>