

NEWS RELEASE

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Gene links rare and unrelated cancers ***An important breakthrough in cancer research***

Scientists at the BC Cancer Agency, Vancouver Coastal Health Research Institute, and the University of British Columbia are excited over a discovery made while studying rare tumour types.

Dr. David Huntsman, genetic pathologist and director of the Ovarian Cancer Program of BC at the BC Cancer Agency and Vancouver Coastal Health Research Institute and Dr. Gregg Morin, a lead scientist from the Michael Smith Genome Sciences Centre at the BC Cancer Agency, led a team who found mutations in rare, seemingly unrelated cancers were all linked to the same gene, known as *DICER*.

The research team set about sequencing rare ovarian, uterine, and testicular tumours, expecting to find that their genomes would be distinct with specific, differing abnormalities. They were amazed to discover the same fundamental mutation in the *DICER* gene showed up as the common process underlying all of the different cancers they examined.

The findings are published today in the *New England Journal of Medicine*.

“*DICER* is of great interest to cancer researchers” says Dr. Huntsman, who also holds the Dr. Chew Wei Memorial Professorship in the departments of Obstetrics and Gynaecology and Pathology and Laboratory Medicine at UBC. “There have been nearly 1,300 published studies about it in the last 10 years, but until now, it has not been known how the gene functions in relation to cancer.”

The gene plays an important role in maintaining health. It has as a “factory style” function, chopping up microRNA molecules to activate them. These microRNA molecules in turn control hundreds of other genes. “This discovery shows researchers that these mutations change the function of *DICER* so that it participates directly in the initiation of cancer, but not in a typical “on-off” fashion,” says Dr. Morin who is also assistant professor in the department of Medical Genetics at UBC. “*DICER* can be viewed as the conductor for an orchestra of functions critical for the development and behaviour of normal cells. The mutations we discovered do not totally destroy the function of *DICER* rather they warp it—the orchestra is still there but the conductor is drunk.”

This finding is the third of a series of papers published recently in the *New England Journal of Medicine* in which the Ovarian Cancer Research team has used new genomic technologies to unlock the molecular basis of poorly understood types of ovarian cancer. This breakthrough is particularly pivotal because it could lead to solutions for treatment of more common cancers.

“Studying rare tumours not only is important for the patients and families who suffer from them but also provides unique opportunities to make discoveries critical to more common cancers— both in terms of personalized medicine, but also in applying what we learn from how we manage rare diseases to more common and prevalent cancers,” says Dr. Huntsman “The discovery of the *DICER* mutation in this varied group of rare tumours is the equivalent of finding not *the* needle in the haystack, but rather the same needle in *many* haystacks.”

“This breakthrough will be of interest to both the clinical and the fundamental science communities,” says Professor Phillip A. Sharp, Institute Professor at the Massachusetts Institute of Technology and co-winner of the 1993 Nobel Prize in Physiology and Medicine for the discovery of the structure of genes. “Huntsman, Morin and colleague's very exciting discovery of specific mutations in *DICER*, a factor essential for syntheses of small regulatory RNAs in ovarian and other human tumours, could lead to new approaches to treatment.”

The research team is now working to determine the frequency and role of *DICER* mutations in other types of cancers and are expanding their collaboration to discover whether mutant *DICER* and pathways it controls can be modulated to treat both the rare cancers in which the mutations were discovered and more common cancers.

The Michael Smith Genome Sciences Centre, located at the BC Cancer Agency, played a key role in this discovery. A decision was made more than 10 years ago, championed by Drs. Michael Smith, Victor Ling, and others to create and locate this facility within the BC Cancer Agency and in close proximity to Vancouver General Hospital. This location has enabled the multidisciplinary cancer research teams in Vancouver access to state of the art technologies and that is now paying off.

“We are one of less than five places in the world doing this type of work successfully. This discovery is one of a series of recent landmark findings from Vancouver that are reshaping our understanding of many cancers,” says Dr. Huntsman. “Since my arrival in Vancouver 20 years ago I have never before sensed such a strong feeling of communal pride and excitement within our research community. Our next task is to bring the discoveries into the clinic.”

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Background

Ovarian Cancer Research Program (OvCaRe) is a multidisciplinary research program involving clinicians and research scientists in gynaecology, pathology, and medical oncology at VGH and BC Cancer Agency. OvCaRe is a unique collaboration between the BC Cancer Agency, Vancouver Coastal Health Research Institute, and the University of British Columbia. The OvCaRe team is considered a leader in ovarian cancer research, breaking new ground in better identifying, understanding, and treating this disease. Their seminal paper in *PLOS (Public Library of Science)*, which outlines the discovery that ovarian cancers are a group of distinct diseases, has been embraced by the global research community who are taking the BC approach to ovarian cancer research.

Canada's Michael Smith Genome Sciences Centre is an internationally recognized state-of-the-art facility applying genomics and bioinformatics tools and technologies to cancer research. Led by Dr. Marco Marra, the Michael Smith GSC is one of ten leading genomic research centres in the world and the only one of its kind in the world integrated into a cancer facility. With a primary focus on cancer genomics research, its scientists have been involved in many world class ground-breaking discoveries over the past decade

Vancouver Coastal Health Research Institute is the research body of Vancouver Coastal Health Authority, which includes BC's largest academic and teaching health sciences centres: Vancouver General Hospital, UBC Hospital, and GF Strong Rehabilitation Centre. The institute is academically affiliated with UBC Faculty of Medicine, and is one of Canada's top funded research centres, with \$82.4 million in research funding for 2009/2010. www.vchri.ca.

BC Cancer Agency, an agency of the Provincial Health Services Authority, is committed to reducing the incidence of cancer, reducing the mortality from cancer, and improving the quality of life of those living with cancer. It provides a comprehensive cancer control program for the people of British Columbia by working with community partners to deliver a range of oncology services, including prevention, early detection, diagnosis and treatment, research, education, supportive care, rehabilitation and palliative care. For more information, visit www.bccancer.ca.

The University of British Columbia (UBC) is one of North America's largest public research and teaching institutions, and one of only two Canadian institutions consistently ranked among the world's 40 best universities. Surrounded by the beauty of the Canadian West, it is a place that inspires bold, new ways of thinking that have helped make it a national leader in areas as diverse as community service learning, sustainability and research commercialization. UBC offers more than 55,000 students a range of innovative programs and attracts \$550 million per year in research funding from government, non-profit organizations and industry through 7,000 grants.