

## **Focus on Faculty #33**

### **Christoph Borchers**



[Dr. Christoph Borchers](#) became a Professor in the Gerald Bronfman Department of Oncology in 2015 and currently holds the Segal Chair in Molecular Oncology. He received his PhD from the University of Konstanz, Germany (1996). After post-doctoral and staff scientist positions at the National Institute of Environmental Health Sciences (NIEHS)-NIH (NC, USA), he became the director of the University of North Carolina-Duke Proteomics Facility, and held a faculty position at the UNC Medical School (2001-2006). Since 2006, Dr. Borchers has been a professor at the University of Victoria (UVic), BC, Canada, where he currently holds a professorship in the Department of Biochemistry and Microbiology, the Rix BC Leadership Chair in Biomedical and Environmental Proteomics, and directorship of the UVic-Genome BC Proteomics Centre. Dr. Borchers' research involves the improvement, development, and application of proteomics and metabolomics technologies, especially quantitative techniques for clinical diagnostics; his research also involves the application of protein chemistry and mass spectrometry (MS) to problems in structural proteomics, with particular emphasis on the mechanism of aggregation of disease-related proteins involved in neurodegenerative diseases.

Support from the Warren Y. Soper Charitable Trust and the Segal Family Foundation has enabled Dr. Borchers to apply proteomics and metabolomics technologies developed at UVic to patient samples obtained at the Jewish General Hospital (JGH). To this end, he is in the process of building a state-of-the-art proteomics facility at the JGH. This facility is currently equipped with 5 mass spectrometers, and 6 staff members, including 2 graduate students from McGill. Over the past 5 years, he supervised 16 students and visiting scientists, including 3 from McGill.

Dr. Borchers has received grant funding for several multimillion-dollar projects, including large-scale projects from Genome Canada (GC) and joint research proposals with faculty members from McGill as co-PIs. One such proposal (started in April 2016) is a joint project, with MRM Proteomics and AstraZeneca, and involves the direct measurement of the drug target, Akt, and its isoforms and variants which play a role in tumour cell proliferation. Two other proposals -- Genome Canada Genome Technology Platform grants -- were awarded in March 2017. One of these involved the development of a Pan-Canadian Proteomics Network with 4 nodes across Canada, including a node at McGill. A similar grant involved the development of metabolomics at McGill.

Dr. Borchers has also founded two spin-off companies: Creative Molecules, Inc. was founded to supply new crosslinking reagents to researchers worldwide at cost. MRM Proteomics Inc. which does contract research in MS-based proteomics, and has recently moved its corporate offices to Montreal.

On a personal note, he is a fan of the soccer club “Borussia Dortmund”, and he enjoys listening to classical music, particularly Gustav Mahler and Richard Wagner.

We asked Dr. Borchers to list a few of his articles whose work he is particularly proud or enjoyed the most. This is what he provided:

Brodie NI, Popov KI, Petrotchenko EV, Dokholyan NV, **Borchers CH**. Solving protein structures using short-distance cross-linking constraints as a guide for discrete molecular dynamics simulations. *Science Advances*, 3(7): e1700479 (2017).

Domanski D, Percy A, Yang J, Chambers A, Hill J, Cohen Freue GV, **Borchers CH**. MRM-based Multiplexed Quantitation of 67 Putative Cardiovascular Disease Biomarkers in Human Plasma. *Proteomics*, 12(8): 1222-43 (2012).

Pan J, Zhang S, Parker CE, **Borchers CH**. Subzero temperature chromatography and top-down mass spectrometry for protein higher-order structure characterization: method validation and application to therapeutic antibodies. *J Am Chem Soc*, 36(37): 13065-71 (2014).

Plaschka C, Larivière L, Wenzek L, Seizl M, Hemann M, Tegunov D, Petrotchenko EV, **Borchers CH**, Baumeister W, Herzog F, Villa E, Cramer P. Architecture of the RNA polymerase II-Mediator core initiation complex. *Nature*, 518(7539): 376-80 (2015).