PhD Program Molecular Medicine

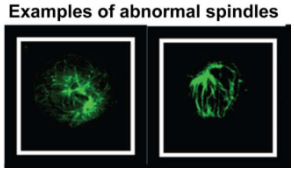
DK Metabolic & Cardiovascular Disease

GUEST LECTURES by

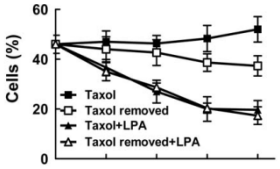
Bioactive phospholipids promote breast tumour progression, metastasis and chemo-resistance

Prof. David Brindley, PhD DSc.

Department of Biochemistry, Faculty of Medicine & Dentistry,
University of Alberta, Edmonton, Canada

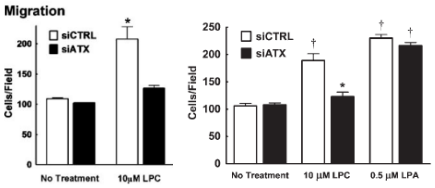


Taxol-treated MCF-7 cells.

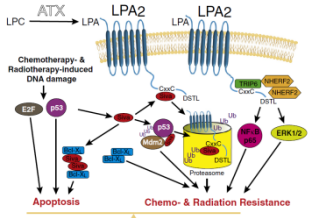


LPA release s MCF-7 cells from Taxol-induced G2/M arrest.

Samadi et al. PlosOne (2011) 6(5):e20608



siATX decreases migration and abolishes its stimulation by LPC. *Gaetano et al.* Molec Carcinogen (2009) 48:801-809

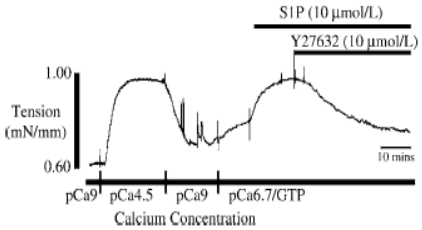


ATX-LPA2 signaling in chemo- and radiation resistance. *Brindley et al.* BBA (2013) 1831:74-85

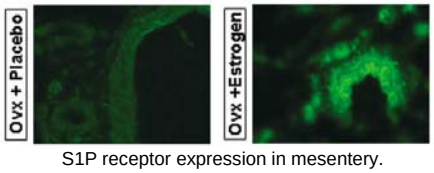
Novel insights into the regulation of vascular tone by sphingosine 1-phosphate

Denise Hemmings, PhD

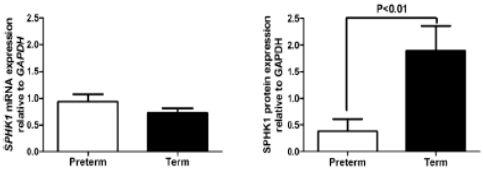
Heritage Medical Research Centre,
University of Alberta, Edmonton, Canada



S1P induced constriction via Rho-associated kinases-dependent Ca^{2+}-sensitization. Hemmings *et al. Biol Reprod (2006) 74:88-94*



S1P receptor expression in mesentery. Hemmings *et al. BjP (2004) 143:276-284*



Sphingosine kinase-1 expression in human decidua. Yamamoto *et al. Biol Reprod (2010) 82:628-635*

Thursday, 26.09.2013, 16:00h

Lecture Hall 04.11 (Universitätsplatz 4, 1st floor), MUG

Dr. David Brindley received his PhD in Medical Biochemistry from the University of Birmingham, UK, under the supervision of Dr. Georg Hübscher. This graduate work and a one-year postdoctoral fellowship investigated the enzymatic mechanisms involved in fat absorption from the small intestine. He then studied as a postdoctoral fellow in the Department of Chemistry, Harvard University, Cambridge, Mass, USA, with Dr. Konrad Bloch when he identified the first bacterial multi-enzyme complex for fatty acid synthase. He was then appointed as a Lecturer in Biochemistry in the newly formed Medical School at the University of Nottingham, UK. He rose through the ranks to become a Professor and was awarded the Personal Chair of Metabolic Control. He also received a DSc in Biochemistry from the University of Birmingham. He then moved to Canada to become a Professor of Biochemistry at the University of Alberta, where he is also Director of the Signal Transduction Research Group. His early work concentrated on the endocrine regulation of lipid and lipoprotein metabolism in relation to changes that occur during physiological stress, dietary modification, diabetes and obesity. This work concentrated on the regulation of phosphatidate phosphatase activity, which was identified in 2006 as being produced by a family of enzymes called lipins. Since the lipins were not readily purified and characterized, David began to study another family of enzymes that he showed to have phosphatidate phosphatase activity. These enzymes are now called lipid phosphate phosphatases (LPPs) and they are involved in regulating signal transduction by lipid phosphates. The LPPs were shown to be ecto-enzymes that degrade circulating lysophosphatidate and sphingosine 1-phosphate. These lipids activate G-protein coupled receptors that control tissue remodeling, embryogenesis, vasculogenesis and wound repair. The LPPs also act on lipid phosphates formed downstream of the activation of G-protein coupled receptors and receptor tyrosine kinases to control cell signalling. Current studies focus on the role of LPPs and lipid phosphates in regulating tumour metastasis and resistance to chemotherapy and radiotherapy. Research funding is provided by the Canadian Institutes of Health Research, Alberta Cancer Foundation, Canadian Breast Cancer Foundation and Ono Pharmaceuticals. David was elected as a Fellow of the Royal Society of Canada for his contribution to lipid research.

Dr. Denise Hemmings is an Associate Professor in the Department of Obstetrics and Gynaecology at the University of Alberta (U of A). She received her PhD from the Department of Medical Microbiology and Immunology at the U of A in 2001 with Dr. Larry Guilbert where she investigated the mechanism by which human cytomegalovirus (HCMV) is transmitted from a pregnant woman to her foetus. She then continued as a postdoctoral fellow with Dr. Sandra Davidge in the Department of Obstetrics and Gynaecology where she studied vascular dysfunction in aging females and developmental origins of adult disease. Dr. Hemmings then used her unique combination of training in virology, vascular biology, reproductive immunology and placentology to develop an independent research program to study the role of a bioactive lipid called sphingosine 1-phosphate (S1P) in pregnancy. Her work as a faculty member focuses on the function of S1P in: (1) maternal vascular adaptations; (2) changes in uterine cell populations involved in early placental development and (3) changes in the uterus that initiate parturition. These studies compare normal pregnancy with those complicated by intrauterine growth restriction and preeclampsia. She is also investigating how active cytomegalovirus infections impair beneficial S1P-mediated effects on vascular tone. Dr. Hemmings is currently funded by the Canadian Institutes of Health Research (CIHR), National Science and Engineering Research Council of Canada and the Women and Children's Health Research Institute of Alberta. Dr. Hemmings serves on several student advisory committees and is a reviewer for many scientific journals and funding agencies. She has a passion for training students and since her appointment in 2005 has, or is currently training more than 50 students from the high school to post-doctoral fellow level. She is the Chair of Women in Scholarship, Engineering, Science and Technology (WISEST), an organization encouraging young women to enter, stay and advance in science, engineering and technology careers. She also encourages students and staff in the basic sciences to step outside of their comfortable scientific boundaries to forge interdisciplinary links with clinicians.