

Dr Alexander Brill

Birmingham Fellow

Cardiovascular and Respiratory Sciences

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About

Alex is a Birmingham Fellow in the School of Clinical and Experimental Medicine. Alex has a strong background in different models of thrombosis, inflammation and microscopy. His main research interests are mechanisms of cardiovascular diseases, such as deep vein thrombosis and stroke, and identifying new targets to prevent and treat these disorders.

Alex received his undergraduate and graduate degrees (MD and PhD) from Saratov State University, Russia. He did his first postdoctoral training with Professor Ofer Lider at the Weizmann Institute of Science, (Israel) studying mechanisms of T cell adhesion and migration. In 2007, he moved to Boston (USA) and did another postdoc at Harvard University in the group of Professor Denisa Wagner. Alex joined the Birmingham Platelet Group in March 2013.

Alex has published more than 30 papers in peer-reviewed scientific journals. He was a co-author of a chapter in the "Platelets" textbook. Alex presented results of his research at numerous international conferences.

Qualifications

- MD
- PhD in human physiology
- Member of International Society on Thrombosis & Haemostasis

Biography

Alexander Brill has more than 18 years of research experience in the cardiovascular and platelet field. He received his MD degree from the Saratov State University (Russia) in 1995 and started his PhD research. He specialized in platelet physiology and effects of laser irradiation on platelet properties. In 1998, he received his PhD degree and joined the team of Prof. Ofer Lider at the Department of Immunology, Weizmann Institute of Science (Israel) as a postdoc. His research at the Weizmann Institute was focused on the physiology of adaptive immune system, predominantly T lymphocytes. During two years at Weizmann Institute, Alexander was studying interactions of T lymphocytes with their microenvironment, extracellular matrix proteins and other cells. In 2001, he became a Head of the research branch at Coagulation Unit, Hadassah Medical Center, Jerusalem, Israel. His research interests during his work at Hadassah included platelet non-haemostatic activities and their role in angiogenesis and inflammation. In 2007, Alexander Brill joined the lab of Prof. Denisa Wagner at Harvard University, Boston, MA, USA. At Harvard, he was dealing with various models of cardiovascular diseases and developed a new model of deep vein thrombosis. In March 2013, Alexander Brill was appointed as a Birmingham Fellow at the University of Birmingham. Alexander has published more than 30 peer-reviewed papers and a chapter in the "Platelets" textbook.

Teaching

- Deliver a lecture "The role of platelets beyond haemostasis"

Postgraduate supervision

- PhD Student

Research

Alex's primary research interests focus on mechanisms of thrombosis- and/or ischemia-reperfusion-related cardiovascular diseases, such as deep vein thrombosis (DVT), stroke and abdominal aortic aneurism. Recently, he demonstrated the pivotal role of von Willebrand factor (VWF), a major adhesive protein in the vessel wall, in initiation of DVT. This study identified interaction of VWF with platelet receptor GPIb α as a potential promising target to prevent DVT. In another study, Alex uncovered a novel unexpected role in DVT of Neutrophil Extracellular Traps (NETs), a recently discovered biological entity consisting of DNA, histones and some other neutrophil proteins. These findings represent a new model of thrombosis, involving NETs as a thrombus-supporting network additional to the classic meshwork of fibrin. Alex has also demonstrated a protective function of High Density Lipoprotein (HDL, "good cholesterol") against DVT and a possibility to use the protein component of HDL as a pharmacological approach for DVT prophylaxis.

At present, Alex explores the impact of innate immune system in DVT and stroke.

Other activities

- Member of the International Society on Thrombosis and Haemostasis

Publications

Brill A, Suidan GL and Wagner DD (2013) Hypoxia, such as encountered at high altitude, promotes deep vein thrombosis in mice. *J Thromb Haemost*, in press

Borissoff JI, Joosen IA, Versteylen MO, Brill A, Fuchs TA, Savchenko AS, Gallant M, Martinod K, ten Cate H, Hofstra L, Crijns HJ, Wagner DD and Kietse laer BLJH (2013) Elevated Levels of Circulating DNA and Chromatin Fragments Are Independently Associated with Severe Coronary Atherosclerosis and a Prothrombotic State. *Arterioscler Thromb Vasc Biol* 33(8):2032-2040

Martinod K, Demers M, Fuchs TA, Wong SL, Brill A, Gallant M, Hu J, Wang Y and Wagner DD (2013) Neutrophil histone modification by peptidylarginine deiminase 4 is critical for deep vein thrombosis in mice. *Proc Natl Acad Sci USA* 110(21):8674-9

Korin N, Kanapathipillai M, Matthews BD, Crescente M, Brill A, Mammoto T, Ghosh K, Jurek S, Bencherif SA, Bhatta D, Coskun AU, Feldman CL, Wagner DD and Ingber DE (2012) Shear-Activated Nanotherapeutics for Drug Targeting to Obstructed Blood Vessels. *Science* 337(6095):738-42

Brill A, Yesilaltay A, De Meyer SF, Kisucka J, Fuchs TA, Kocher O, Krieger M and Wagner DD (2012) Extrahepatic HDL Receptor SR-BI and apoA-I Protect against Deep Vein Thrombosis in Mice. *Arterioscler Thromb Vasc Biol* 32(8):1841-7

Brill A, Fuchs TA, Savchenko A, Thomas GM, Martinod K, De Meyer SF, Bhandari A and Wagner DD (2012) Neutrophil extracellular traps promote deep vein thrombosis in mice. *J Thromb Haemost* 10(1):136-44

Brill A, Fuchs TA, Chauhan AK, Yang JJ, De Meyer SF, Köllnberger M, Wakefield TW, Lämmle B, Massberg S and Wagner DD (2011) von Willebrand factor-mediated platelet adhesion is critical for deep vein thrombosis in mouse models. *Blood* 117(4):1400-7

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