

Abdullah O. Khan PhD. MRes. BSc (Hons).

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Profile and Research Interests

My background is in the application of CRISPR-Cas9, super-resolution microscopy, and induced pluripotent stem cell differentiation for the study of inherited bleeding disorders. My research interests are in developing novel approaches for the study of bone marrow biology and pathologies. I aim to develop expertise in biomaterials and 3D printing to design and generate physiologically relevant culture systems for the study of megakaryocytic biology in the context of their microenvironment. In the longer term I intend to apply these methods to the development of novel high throughput screening platforms for drug screening and disease modelling, as well as the engineering of patient-iPSC derived grafts.

Research Positions

HENRY WELLCOME FELLOW (218649/Z/19/Z) - HARVARD MEDICAL SCHOOL, UNIVERSITY OF OXFORD, AND UNIVERSITY OF BIRMINGHAM - 2020-2024

BHF FUNDED POST-DOCTORAL RESEARCH FELLOW, UNIVERSITY OF BIRMINGHAM - 2018-2020

PHD CARDIOVASCULAR SCIENCES, INSTITUTE OF CARDIOVASCULAR SCIENCES, COLLEGE OF MEDICAL AND DENTAL SCIENCES, UNIVERSITY OF BIRMINGHAM - 2015-2018

Education

MRES MOLECULAR MECHANISTIC TOXICOLOGY, UNIVERSITY OF BIRMINGHAM - 2011-2012

BSC. (HONS) HUMAN BIOLOGY, UNIVERSITY OF BIRMINGHAM - 2007-2010 (2.1, 68%)

Publications

First and Corresponding*:

1. **Khan, A.O***, Reyat, J.S., Bourne, J.H., Colicchia, M., Newby, M.L., Allen, J.D., Crispin, M., Youd, E., Murray, P.G., Taylor, G.S. and Stamataki, Z., 2021. Stimulation of vascular organoids with SARS-CoV-2 antigens increases endothelial permeability and regulates vasculopathy. *medRxiv* 2021. doi: <https://doi.org/10.1101/2021.04.25.21255890>. (Under Review - ATVB).
2. **Khan, A.O***, Slater, A., Maclachlan, A., Nicolson, P.L., Pike, J.A., Reyat, J.S., Yule, J., Stapley, R., Rayes, J., Thomas, S.G. and Morgan, N.V., 2020. Post-translational polymodification of β 1-tubulin regulates motor protein localisation in platelet production and function. *Haematologica*. (Online ahead of print. doi: 10.3324/haematol.2020.270793. PMID: 33327716).
3. **Khan, A.O.**, Stapley, R.J., Pike, J.A., Wijesinghe, S.N., Reyat, J.S., Almazni, I., Machlus, K.R., Morgan, N.V. and UK GAPP Study Group, 2021. Novel gene variants in patients with platelet-based bleeding using combined exome sequencing and RNAseq murine expression data. *Journal of Thrombosis and Haemostasis*, 19(1), pp.262-268.
4. **Khan, A.O.**, Di Maio, A., Guggenheim, E.J., Chetwynd, A.J., Pencross, D., Tang, S., Belinga-Desaunay, M.F.A., Thomas, S.G., Rappoport, J.Z. and Lynch, I., 2020. Surface chemistry-dependent evolution of the nanomaterial corona on TiO₂ nanomaterials following uptake and sub-cellular localization. *Nanomaterials*, 10(3), p.401.
5. **Khan, A.O.*** and Pike, J.A., 2020. Super-resolution imaging and quantification of megakaryocytes and platelets. *Platelets*, 31(5), pp.559-569.
6. **Khan, A.O.**, Maclachlan, A., Lowe, G.C., Nicolson, P.L., Al Ghaithi, R., Thomas, S.G., Watson, S.P., Pike, J.A. and Morgan, N.V., 2020. High-throughput platelet spreading analysis: a tool for the diagnosis of platelet-based bleeding disorders. *Haematologica*, 105(3), p.e124.
7. **Khan A.O**, White C.W, Pike J.A, Yule J, Slater A, Hill SJ, Poulter NS, Thomas S.G, Morgan N.V. Optimised insert design for improved single-molecule imaging and quantification through CRISPR-Cas9 mediated knock-in. *Scientific Reports*. 2019 Oct 2;9(1):14219. doi: 10.1038/s41598-019-50733-9.
8. **Khan AO**, Simms VA, Pike JA, Thomas SG, Morgan NV. CRISPR-Cas9 Mediated Labelling Allows for Single Molecule Imaging and Resolution. *Scientific Reports*. 2017 Aug 16;7(1):8450. doi: 10.1038/s41598-017-08493-x.

Internal author:

9. A hypo-responsive platelet phenotype that aggravates with disease progression is associated with unfavorable outcome in COVID-19 - a prospective longitudinal single center study

Waltraud C. Schrottmaier¹, Anita Pirabe¹, David Pereyra^{1,2}, Stefan Heber³, Hubert Hackl⁴, Anna Schmuckenschlager¹, Laura Brunenthaler¹, Jonas Santol², Kerstin Kammerer¹, Justin Oosterlee¹, Erich Pawelka⁵, Sonja M. Treiber¹, Abdullah O.

Khan⁶, Matthew Pugh⁷, Marianna T. Traugott⁴, Christian Schörghofer⁸, Tamara Seitz⁵, Mario Karolyi⁵, Bernd Jilma⁸, Julie Rayes⁶, Alexander Zoufaly⁵, Alice Assinger¹.

10. Image-based high-throughput analysis in zebrafish embryos reveals surface functionalisation-dependent adverse effects of metal nanoparticles and nanoplastics

11. Lacey, J., Webster, S.K., Heath, P.R., Hill, C.J., Wagner, B.E., **Khan, A.O.**, Morgan, N.V., Makris, M., Daly, M.E. Sorting Nexin 24 is required for a-granule biogenesis and cargo delivery in megakaryocytes. (*Haematologica*, Under Review).

12. Campos, J., Ponomaryov, T., De Prendergast, A., Whitworth, K., Smith, C.W., **Khan, A.O.**, Kavanagh, D. and Brill, A., 2021. Neutrophil extracellular traps and inflammasomes cooperatively promote venous thrombosis in mice. *Blood Advances*, 5(9), 2319-2324.

13. Almazni, I., Stapley, R.J., **Khan, A.O.** and Morgan, N.V., 2020. A comprehensive bioinformatic analysis of 126 patients with an inherited platelet disorder to identify both sequence and copy number genetic variants. *Human Mutation*, 41(11), pp.1848-1865.

14. Stapley, R.J., Smith, C.W., Haining, E.J., Bacon, A., Lax, S., Pisareva, V.P., Pisarev, A.V., Watson, S.P., **Khan, A.O.**, and Morgan, N.V., 2021. Heterozygous mutation SLFN14 K208N in mice mediates species-specific differences in platelet and erythroid lineage commitment. *Blood advances*, 5(2), pp.377-390.

15. Pike, J.A., Simms, V.A., Smith, C.W., Morgan, N.V., **Khan, A.O.**, Poulter, N.S., Styles, I.B. and Thomas, S.G., 2021. An adaptable analysis workflow for characterization of platelet spreading and morphology. *Platelets*, 32(1), pp.54-58.

16. Pike, J.A., **Khan, A.O.**, Pallini, C., Thomas, S.G., Mund, M., Ries, J., Poulter, N.S. and Styles, I.B., 2020. Topological data analysis quantifies biological nano-structure from single molecule localization microscopy. *Bioinformatics*, 36(5), pp.1614-1621.

17. Nicolson, P.L., Nock, S.H., Hinds, J., Garcia-Quintanilla, L., Smith, C.W., Campos, J., Brill, A., Pike, J.A., **Khan, A.O.**, Poulter, N.S. and Kavanagh, D.M., 2021. Low-dose Btk inhibitors selectively block platelet activation by CLEC-2. *Haematologica*, 106(1).

18. Fletcher, S.J., Pisareva, V.P., **Khan, A.O.**, Tcherepanov, A., Morgan, N.V. and Pisarev, A.V., 2018. Role of the novel endoribonuclease SLFN14 and its disease-causing mutations in ribosomal degradation. *Rna*, 24(7), pp.939-949.

19. Khan, K.A., Naylor, A.J., **Khan, A.**, Noy, P.J., Mambretti, M., Lodhia, P., Athwal, J., Korzystka, A., Buckley, C.D., Willcox, B.E. and Mohammed, F., 2017. Multimerin-2 is a ligand for group 14 family C-type lectins CLEC14A, CD93 and CD248 spanning the endothelial pericyte interface. *Oncogene*, 36(44), pp.6097-6108.

20. Poulter, N.S., **Khan, A.O.**, Pallini, C. and Thomas, S.G., 2018. Single-Molecule Localization and Structured Illumination Microscopy of Platelet Proteins. In *Platelets and Megakaryocytes* (pp. 33-54). Humana Press, New York, NY.

21. Guggenheim, E.J., **Khan, A.**, Pike, J., Chang, L., Lynch, I. and Rappoport, J.Z., 2016. Comparison of confocal and super-resolution reflectance imaging of metal oxide nanoparticles. *PloS one*, 11(10), p.e0159980.

22. Mazzolini, J., Weber, R.J., Chen, H.S., **Khan, A.**, Guggenheim, E., Shaw, R.K., Chipman, J.K., Viant, M.R. and Rappoport, J.Z., 2016. Protein corona modulates uptake and toxicity of nanoceria via clathrin-mediated endocytosis. *The Biological Bulletin*, 231(1), pp.40-60.

23. Hansjosten, I., Rapp, J., Reiner, L., Vatter, R., Fritsch-Decker, S., Peravali, R., Palosaari, T., Joossens, E., Gerloff, K., Macko, P., **Khan, A.O.**, Whelan, M., 2018. Microscopy-based high-throughput assays enable multi-parametric analysis to assess adverse effects of nanomaterials in various cell lines. *Archives of Toxicology*, 92(2), pp.633-649.

Invited Talks

FOURTH MAASTRICHT CONSENSUS CONFERENCE - MARCH 2022

Bioprinted organoids for the study of vascular pathologies.

THE PLATELET SOCIETY GUS BORN LECTURES - MARCH 2021

Developing iPSC and bioprinted organoids for the study of platelet production and biology.

BRITISH SOCIETY OF THROMBOSIS AND HAEMOSTASIS EMERGING FELLOWS INVITED TALK - JANUARY 2020

Using iPSC and 3D bioprinting to engineer a novel bone marrow organoid.

SUPER-RESOLUTION MEETING, UNIVERSITY OF LEEDS - DECEMBER 2018

Using CRISPR to express photoswitchable tags genetically for single molecule imaging.

BRIGHAM AND WOMEN'S, HARVARD MEDICAL SCHOOL AND PLATELET BIOGENESIS - OCTOBER 2018

Developing CRISPR and iPSC based protocols for the study of inherited thrombocytopenia.

Conference Presentations

BLOOD AND BONE SEMINAR SERIES - JULY 2020

Oral Presentation - Polymodification of *TUBB1*.

COMPARE ANNUAL RESEARCH SYMPOSIUM - SEPTEMBER 2018

Oral Presentation - Optimised CRISPR-PALM for Single Molecule Quantification through Endogenous Expression.

INSTITUTE OF CARDIOVASCULAR SCIENCES AWAY DAY - JUNE 2018

Oral Presentation - Thrombocytopenia, *TubB1*, and the Tubulin Code.

MIDLANDS ACADEMY OF SCIENCE MEETING - MARCH 2018

Oral Presentation: Applying CRISPR-Cas9 and super-resolution microscopy for the study of inherited thrombocytopenia.

ACTIN - DECEMBER 2017

Poster Presentation: Applying CRISPR-Cas9 and super-resolution microscopy for the study of inherited thrombocytopenia.

UK-ITALIAN PLATELET MEETING - SEPTEMBER 2017

Oral Presentation: Applying CRISPR-Cas9 and super-resolution microscopy for the study of inherited thrombocytopenia.

GORDON RESEARCH SEMINAR AND CONFERENCE, MEGAKARYOCYTIC AND PLATELET BIOLOGY - FEB/MARCH 2017

Oral and Poster Presentations: Applying CRISPR-Cas9 and super-resolution microscopy for the study of inherited thrombocytopenia.

SHEFFIELD STORM SYMPOSIUM - JANUARY 2017

Oral Presentation: CRISPR-PALM as an accurate, quantitative approach to single molecule localisation microscopy (flash talk).

ACTIN - DECEMBER 2016

Poster Presentation: Single molecule imaging of the cytoskeleton through CRISPR mediated endogenous expression.

Awards

BRITISH HEART FOUNDATION REFLECTIONS OF RESEARCH COMPETITION (£100) - 2018

Winner of Supporter's Prize (August 2018), image featured as MRC Biomedical Picture of The Day (BPOD).

ICVS TRAVEL GRANT (£500) - 2017

Awarded for travel to the Gordon Research Conference.

POSTER PRIZE (£100) - 2017

Institute of Cardiovascular Sciences Away Day.

POSTER PRIZE (€100) - 2017

Gordon Research Seminar Series Poster Prize.