



# Imran Khan

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**SUMMARY** Skilled biomedical researcher bringing over 5 years of experience in pre-clinical animal research. Enthusiastic about furthering scientific knowledge through innovation and collaborative effort.

## RESEARCH EXPERIENCE

- **POSTDOCTORAL RESEARCH FELLOW (0.5FTE)**  
ARC-Linkage Industrial partnership  
Curtin University, Perth, WA *7/2022 till date*
  - Management- industrial and academic research projects.
  - Research - Identification and pre-clinical testing of novel anti-diabetic peptides from Lupin seeds.
  - Designed and optimised protein purification protocols, insulin secretion assays.
  - Administration—animal ethics applications, health monitoring protocols for pre-clinical animals, inventory, and budget management, equipment purchase and negotiating interdepartmental equipment use.
  
- **POSTDOCTORAL RESEARCH FELLOW**  
Industrial partnership  
GSK/Peter MacCallum Cancer Centre, Melbourne, VIC *10/2021 - 06/2022*
  - Research- Developed in vitro and animal cancer models to discover molecular mechanisms of oral cancer. Identify and test novel cancer therapeutics.
  - Product development – Identified new cancer therapeutic candidates and advised industrial partners in product selection for further development.
  - Administration animal and human ethics application, health, and safety representative, liaise with internal and external collaborators to achieve commercial and research goals.
  
  - Devised appropriate data analytics pipeline to identify biologically relevant commercial products.
  - Supervision- Supervised junior researchers, PhD, and Honours research students.
  - Grant- STOmics BGI grant- \$25,000
  
- **POSTDOCTORAL RESEARCH FELLOW**  
Industrial collaboration  
Unilever, UK /Curtin University, Australia *03/2019 - 10/2021*

- Research-Developed a novel vascularised three-dimensional biological substitute to human skin, conducted pre-clinical evaluation in mice models. Developed new methods to isolate, culture, study and use human skin cells for commercial applications.
  - Administration- intellectual property management, animal ethics, budgets
  - Supervision – Junior postdocs, Honours, and PhD students
- **RESEARCH ASSOCIATE/ POSTDOCTORAL RESEARCH FELLOW**  
Curtin University 06/2016- 12/2018
    - Research- Investigated molecular mechanisms of neurodegeneration using pre-clinical animal models.
    - Drug development- developed pre-clinical in vitro assays and animal models to assess toxicity, efficacy, pharmacokinetics and pharmacodynamic of a novel insulin-mimicking drug. Developed a new mass spectrometry protocol to detect drug metabolites in brain and serum.
    - Cohort study- Investigated Presenilin 2 truncated transcript (PS2V) as a potential biomarker of progression of neurodegeneration and cognitive decline in longitudinal AIBL cohort.
    - Discovery- Role of amyloid beta 42 protein oligomers in platelet activation and aggregation.
    - Supervision- research staff, Honours, and master's students
    - Administration-Animal ethics applications, managing budgets, coordinating with national and international collaborators for completion of research activities and data analysis, and manuscript preparation.
    - Grants- participated in writing grant applications
  - **ZEBRAFISH FACILITY MANAGER (0.5FTE)** Edith Cowan University, Perth, WA  
08/2012- 12/2014
    - Managed a ~2000 Zebrafish research facility.  
Zebrafish breeding, monitoring water chemistry, preparing live feed, feeding and health monitoring
  - Coordinated with management to organise and supervisor housekeeping activities like aquarium repairs and maintenance.
    - Organised disposal of biohazard waste and purchase of PPE and equipment.
    - Preparing the facility for governmental, internal, and external inspections.
    - Training - Zebrafish research techniques
  - **RESEARCH ASSISTANT**  
Stem cell biology
    - UAE University, Al Ain, UAE 06/2009 - 05/2012
    - Research- Investigating role of hypervitaminosis in development of foetal/neonatal gastric epithelium.  
Administrative- Managed a colony of 500 mice to governmental code

Training- aseptic surgical techniques euthanasia, injections, tissue isolation and processing for histological analysis and cell sorting.

- Supervised - undergraduate and masters' students.

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- **PH.D. NEUROSCIENCE**

- UWA, Perth WA

*06/2012- 08/2017*

- Thesis: Utilising the MultiBac baculoviral expression system to reconstruct and purify the gamma secretase enzyme.

Investigated molecular mechanisms of Alzheimer's disease pathogenesis.

**EDUCATION**

Cryo-EM and single particle analysis.

- Supervised students and trained research staff in use of high precision instruments like HPLC systems and SPR.
- Developed novel high-throughput cellular and biochemical assays for drug discovery.

- **MASTER OF RESEARCH IN STEM CELL BIOLOGY**

- University of Nottingham, United Kingdom

*07/2009*

- Dissertation: Role of MAP Kinase and PI3 Kinase signalling in vascularisation and Haematopoiesis in Zebrafish.

- Generated transgenic Zebrafish models.

Bulk RNA sequencing analysis

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- **BACHELOR OF SCIENCE BIOTECHNOLOGY**

- Bangalore University, India

*04/2005*

- Dissertation: Expression analysis of p53 protein at various stages of oesophageal squamous cell carcinoma- All India Institute of Medical Sciences (AIIMS), New Delhi

Major subjects Biotechnology, microbiology, and chemistry

Minor Subjects: Entrepreneurship, English Literature

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- Protein analysis- Development of enzyme activity and kinetic assays, protein sequence and structure analysis, protein mutation-structure analysis, protein interaction assays and immunoprecipitation. Immunohistochemistry techniques, Protein microarray analysis, immunofluorescence, and proximity ligation staining. Western immunoblotting, FRET, BRET, 3D gel electrophoresis, co-immunoprecipitation, ELISA and AlphaLISA. HPLC- protein purification and protein interaction studies, SPR- ligand receptor interactions, proteoliposome- ligand interaction studies, subcellular fractionation for intracellular protein distribution.
- Protein expression and purification- Biomolecule purification process development, recombinant protein expression in mammalian, bacterial and insect cells. Transient and stable protein expression using liposomes, lentiviral, retroviral and baculoviral transduction. Protein purification

## RESEARCH SKILLS

techniques- affinity purification, gel filtration, ion exchange and hydrophobic interaction purification. Expert in use of Akta purifier and NGC HPLC systems.

Structural Biology: Cryo-EM sample preparation, single particle analysis, negative staining, data acquisition and homology modelling. Proficient in use of cryoSPARC, UCSF-CHIMERA and PyMol.

- Mass Spectrometry- Sample preparation and optimisation for quantification of proteins, drugs and metabolites in various biological samples, optimisation of LCMS protocols (LCMS) and data analysis (certificate in "LCMS operations" from Murdoch University). Proficient in use of Agilent 6540 QTOF MS
- Animal models: PDX and orthotopic mice models, diabetes, and neurodegeneration mouse models. Mating, health monitoring embryo staging and embryo manipulation-Zebrafish, frog, guinea pigs, mice, rat, and axolotl. Mice, rat, and guinea pig techniques- intraperitoneal (ip), intravenous (iv), and subcutaneous injections (sc), osmotic pump installation, cardiac puncture, retro-orbital bleeding, submandibular puncture of facial vein, tail bleeding, saphenous vein bleeding, oral gavage, aseptic surgical technique, peri and post operative health and welfare monitoring. Zebrafish techniques- mating, embryo-staging, high throughput assays, microinjections, embryo-manipulation techniques, whole-mount in situ hybridisation and confocal microscopy.
- Cognitive tests (mice and rats): Active and passive avoidance test and Morris water maze.
- Molecular Biology Techniques- DNA and RNA isolation from a variety of biological samples, quantification using TapeStation and Qubit, genotyping, RT-PCR, Q-PCR, DIPs-PCR, nested-PCR, multiplex-PCR, OE-PCR, digital PCR, in situ-PCR, methylation specific PCR, CHIP-PCR, recombinant DNA techniques, SYBR Green and TaqMan assays, single cell RNA sequencing and spatial transcriptomic analysis, microarray analysis, Multiplex RNA and DNA FISH, protein expression vector design, sequence engineering, gene knockdown assays, use of CRISPR techniques for genomic manipulation, morpholino, shRNA and siRNA design and application.
- Flow cytometry- Optimising human and mice tissue processing techniques for flow cytometry, cell sorting and single cell analysis, multicolour antibody panel design, cytometry bead array (CBA) assay design, cell cycle analysis and rare cell detection. Expert in use and troubleshooting BD LSRFortessa, BD FACSCanto II, Attune NXT, BD FACSJazz and use of FACS Diva, FlowJo, FlowLogic, and FCAP array software for data analysis.
- Cell Culture techniques: primary cell culture from human, mouse, rat and guinea pig, hippocampus and cortex ring cultures, 3D organotypic cultures, brain organoids, bioreactor scale culture of mammalian and insect cells. Transient and stable expression using adenoviral and lentiviral transduction, CRISPR/Cas9 techniques and gene silencing techniques.
- Microscopy: Confocal, multispectral and two photon imaging, Organelle labelling and imaging, live cell imaging, 3D imaging, FRET and BRET, laser capture microdissection, wide field of view multifocal microscopy, super resolution microscopy, optical clearing of tissues, deconvolution, background,

and illumination correction techniques. equipment - UltraView, Nikon A1 and ANDOR Dragonfly and Axio Scan Z1 slide scanner. Expert in use of ImageJ, Imaris, Image-Pro, ZEN, Volocity and NIS elements for automated analysis of large imaging datasets.

- Stem cell biology techniques-iPSc generation and ESC culture, differentiation and disease modelling, genetic manipulation
- Drug development: High-throughput assay development, target discovery and identification of lead compounds, development of in vitro and in vivo assays and preclinical assessment of novel drugs- toxicity, efficacy, pharmacology, and pharmacodynamics.
- Statistical analysis and modelling in R and Python, SPSS, GraphPad
- Ingenuity Pathway analysis, Vector NTI, Geneious, ApE, Cre-ACEMBLER and SnapGene
- Graphics - Adobe Photoshop, Illustrator and InDesign, Molecular Flipbook, Biorender and Autodesk Maya
- Bioinformatics tools-data warehousing, single cell and spatial transcriptomics integrated analysis in R and Python, Expert in use of ENSEMBL and NIH genome browser, Uniprot database, BRENDA enzyme database, OMIM and REACTOME pathway analysis, RSCB protein structure database, Flybase, Zfin, EBI and MGI expression and mutation database, Allen's brain Atlas, phylogenomic analysis, gene annotation, mutation mapping.
- Administrative skills- inventory management, supervision, and training, health and safety, risk management, intellectual property management, human and animal ethics applications,
- Professional Skills – Excellent work ethic, troubleshooting, organizational and time management skills, data management, leadership skills, supervision, teaching and training, excellent interpersonal, communication and collaborative skills.

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- Oncology Research Fellow- University of Melbourne, 2022.
- Grant Success- STOmics BGI grant \$25,000, 2022.  
International Postgraduate Research Scholarship, University of Western Australia 2012-2016
- Scholarships for International Research Fees, University of Western Australia 2012-2015
- PhD Completion scholarship, University of Western Australia- 2016
- International Research Top-Up scholarship, University of Western Australia 2012
- Travel award Australasian Neuroscience Conference, Adelaide, Australia 2014
- Travel award AD/PD conference, Nice, France, 2015

#### AWARDS

#### GRANTS SCHOLARSHIPS

## PUBLICATIONS

- Khan, I, Krishnaswamy, S, Sabale, M, et al. Efficient production of a mature and functional gamma secretase protease. Scientific reports 8, 2834 (2018).
- Elaskalani, O, Khan, I, Morici, M, Matthysen, C, Sabale, M, Martins, RN, Verdile, G and Metharom, Pat. Oligomeric and fibrillar amyloid beta 42 induce platelet aggregation partially through GPVI. Platelets, 1-6 (2017). (Co-first author)  
Newman, M, Kretzschmar, D, Khan, I, Chen, M, Verdile, G and Lardelli, M. Animal Models of Alzheimer's Disease. in Animal Models for the Study of Human Disease (Second Edition) 1031-1085 (Elsevier, 2017).
- Newman, M, Wilson, L, Verdile, G, Lim, A, Khan, I, Nik, S H M, et al. Differential, dominant activation and inhibition of Notch signalling and APP cleavage by truncations of PSEN1 in human disease. Human molecular genetics 23, 602-617 (2014).
- Nik, SHM, Porter, T, Newman, M, Bartlett, B, Khan, I, Sabale, M, et al Relevance of a truncated PRESENILIN 2 transcript to Alzheimer's disease and neurodegeneration. Journal of Alzheimer's Disease. 1479-1489 (2021)
- Rasheed Z, Al-Shobaili HA, Rasheed N et al. (2016) MicroRNA-26a-5p regulates the expression of inducible nitric oxide synthase via activation of NF-κB pathway in human osteoarthritis chondrocytes. Archives of biochemistry and biophysics 594, 61-67
- Manuscript under review: Shinsuke Matsuzaki, Melissa Eccles, Hironori Takamura, Miheer Sabale, Taiichi Katayama, David Groth, Imran Khan, Giuseppe Verdile Presenlin-1/2 chimeras indicate specific combinations of protein domains responsible for differential cleavage of Amyloid Precursor Protein and Notch Receptor Journal of Alzheimer's Disease

## PRESENTATION

- High school Lectures- 2-hour lectures/ twice a year 2012-2017
- ADPD conference, Nice France, Reconstitution of gamma secretase enzyme complex using the MultiBac expression system. 2015  
Neurodegeneration workshop, Curtin University, Perth - Expressing protein complexes using multi-cistronic expression vectors. 201
- ASMR conference, Perth - Expressing and purifying gamma secretase enzyme complex. 2014
- Australasian Neuroscience Society, Adelaide - Utilising the MultiBac baculovirus protein expression system to express the gamma secretase enzyme complex. 2014

## COMMUNITY ENGAGEMENT

- Organised a public lecture series on Alzheimer's Disease- Edith Cowan University, 2014.
- Organised and led a public tour of the research facilities at Edith Cowan University, 2014, 2015.  
Organised and participated in an AD information booth during the Research week 2014-2016.
- Participated in open day activities Edith Cowan University 2012-2015, Curtin University 2015-2020.
- Lecture on Science and scientific method to lower and upper secondary school students, Kingsway Christian College, 2012-2017

