Finally, we leveraged these molecular features to reprogram Cas13b to silence several gene fusion transcripts that drive a variety of tumours. We show that targeting the breakpoint of fusion transcripts with de novo designed tiled crRNAs yields very high and specific silencing, with absolute discrimination between tumour-associated fusion transcripts and the wild-type variants expressed in normal cells.

Taken together, this study provides a molecular blueprint for Cas13b reprogramming against pathogenic transcripts.

Reference

1. Fareh M, Zhao W, Hu W, *et al.* Reprogrammed CRISPR-Cas13b suppresses SARS-CoV-2 replication and circumvents its mutational escape through mismatch tolerance. Nat Commun 2021; 12: 4270.

RETINAL GENE THERAPIES

Tom Edwards

Centre for Eye Research Australia, The Royal Victorian Eye and Ear Hospital, Melbourne, Vic, Australia

The eye is uniquely suited to gene-based therapies designed to target degenerative disease affecting the retina. These include progressive Mendelian inherited single gene disorders that lead to retinal degeneration and severe visual impairment. Inherited retinal disease is the most common cause of visual impairment in working aged Australians and is largely incurable. A number of gene-based therapies have reached clinical trial phase, with one granted TGA approval in 2021. Whilst this is certainly an exciting time for clinicians and patients alike, many challenges remain. This presentation will summarise the current status of retinal gene therapy, the surgical technique for gene delivery and future directions.

USING EQA DATA TO DETERMINE RISK IN MOLECULAR DIAGNOSTIC TESTS

Sze Yee Chai[1], Nalishia Munusamy[1], Bruce Bennetts[2], Tony Badrick[1]

[1]*Molecular Genetics, Royal College of Pathologists of Australasia Quality Assurance Programs (RCPAQAP), Sydney, NSW, Australia;* [2]*Department of Molecular Genetics, The Children's Hospital at Westmead, Sydney, NSW, Australia*

Genetic pathology is a rapidly evolving field that plays a crucial part in diagnostic, prognostic and treatment decisions that directly influence the management of patients. Molecular testing errors resulting in false-negative or false-positive results can therefore be harmful to patients. To ensure that patients receive reliable results, participation in external quality assurance (EQA) programs is both an ISO requirement and essential to guarantee optimal clinical testing and reporting. The purpose of EQA programs includes continuous evaluation and monitoring of laboratory performance for specific tests, identification of inter-laboratory differences, evaluation of method performances, and the harmonisation and standardisation of testing and reporting to improve results comparability. Presently, the RCPAQAP offers EQA programs mainly to clinical laboratories within the Australasia and Asia regions amongst a number of EQA providers based in Europe and the United States. A review of the 2020–2021 laboratory performance in the RCPAQAP Molecular Genetics EQA programs, and the potential risks to patients, will be discussed.

THE AUSTRALIAN GENOMICS CLINICAL, DIAGNOSTIC AND RESEARCH NETWORK

John Christodoulou[1], Hamish Scott[2], Julie McGaughran[3]

[1]*Australian Genomics, Murdoch Children's Research Institute, The University of Melbourne, Melbourne, Vic, Australia;* [2]*Department of Genetics and Molecular Pathology, Centre for Cancer Biology, An SA Pathology and UniSA alliance, SA Pathology, Adelaide, SA, Australia;* [3]*Genetic Health Queensland, Metro North Health, The University of Queensland, Brisbane, Qld, Australia*

Australian Genomics is an initiative that supports nationally funded genomic research projects. In doing so, Australian Genomics brings together key stakeholders into networks, with the express goal of using the outcomes of this research to help shape the equitable and robust delivery of clinical genomics in the Australian healthcare context.

The Clinical, Diagnostic and Research (CDR) Network is one of these key networks, with a multidisciplinary group over 80 genomics researchers, diagnosticians and healthcare professionals from across Australia. The frequency of the meetings for its stakeholders offers a more rapid, diverse and discursive communication forum than the various annual meetings such as Path update and HGSA, helping the genomics community keep abreast of the latest international and nationally relevant developments in our rapidly moving field.

The network meets regularly to discuss genomics initiatives, issues and opportunities, and to share the latest advancements in the field. Guest speakers present at each meeting on genomics initiatives, research and technological advances. The network also provides a forum for Australian Genomics and external stakeholders to engage the nation's genomics experts in initiatives of national and international significance, with recent examples including the consultation response to the Pricing Framework for Australian Public Hospital Services, consultation responses to MSAC applications, and Australian Genomics' business continuity plan.

A key challenge is ensuring that Australian Genomics can offer its support and acquired expertise to the genomics community beyond the life of the current grant. To this end, consultation is underway to develop an enduring continuity plan.

OPTICAL GENOME MAPPING USING BIONANO: A COMPARATIVE STUDY OF GENOMIC CHANGES IN HAEMATOLOGICAL MALIGNANCIES PERFORMED AT THE JOHN HUNTER HOSPITAL

Katie A. Ashton[1], Nadine K. Berry[1], Ashleigh Fodeades[1], Raewyn Billings[1], Susan Dooley[2], Eva Chan[2], Cliff Meldrum[2], Kristen Palmer[2], Andrew Harland[3], Andrew Ziolkowski[1], Anoop K. Enjeti[1,4,5], Rodney J. Scott[1,2,4]

[1]*Department of Molecular Medicine, NSW Health Pathology, John Hunter Hospital, NSW, Australia;* [2]*Statewide Services/ Genomics, NSW Health Pathology, Newcastle, NSW, Australia;* [3]*ICT Services, NSW Health Pathology, John Hunter Hospital, NSW, Australia;* [4]*University of Newcastle, NSW, Australia;* [5]*Calvary Mater Hospital, Newcastle, NSW, Australia*