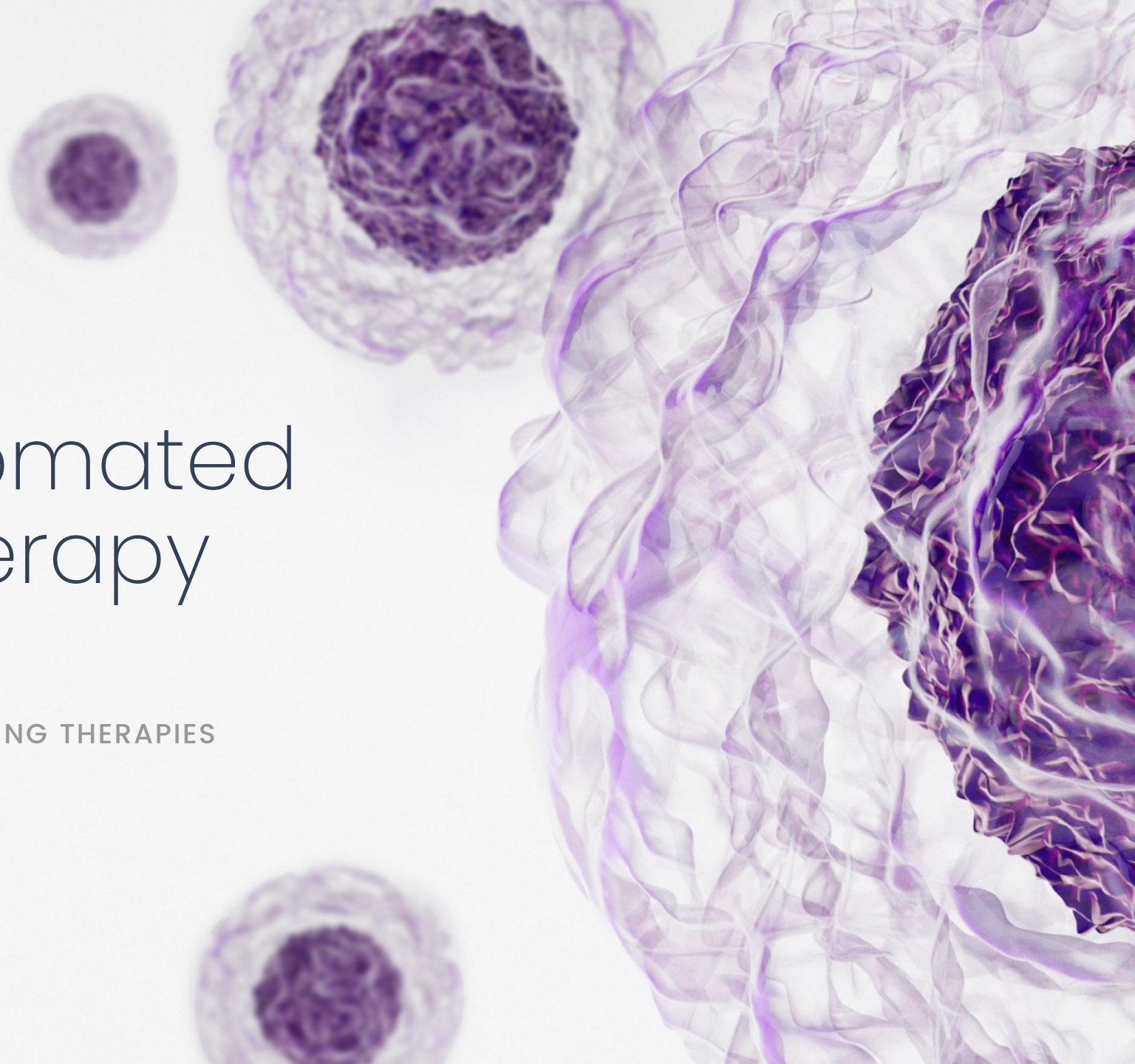
BioOra

CELL THERAPY FOR EVERY PATIENT IN NEED

Pioneering Automated Cell & Gene Therapy Manufacturing

SCALING AND COMMERCIALISING LIFE-SAVING THERAPIES
FROM AOTEAROA NEW ZEALAND



Bicora

CELL THERAPY FOR EVERY PATIENT IN NEED

What can we NOT do today because of computational roadblocks and bottlenecks, and how would quantum computing solve this?

John Robson

MANAGING DIRECTOR

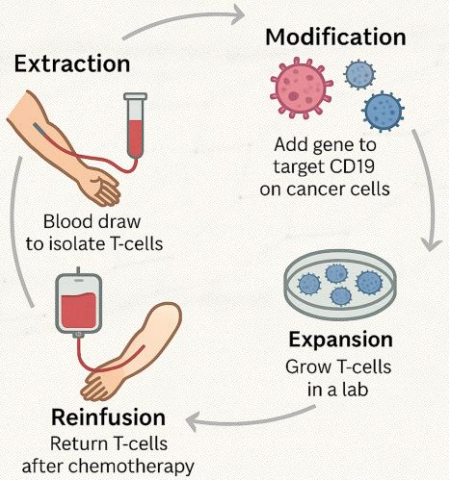
WHAT CAN WE DO TODAY?

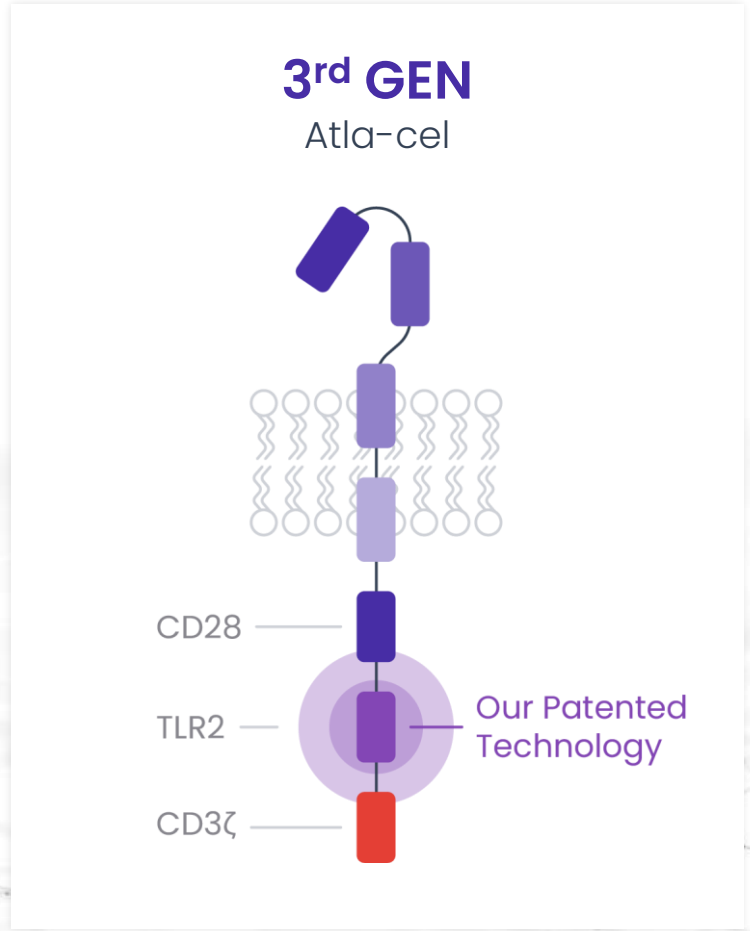
BiOra
CELL THERAPY FOR EVERY PATIENT IN NEED

We can genetically modify your T-cells

CAR T-cell therapy has revolutionised the treatment of blood cancers

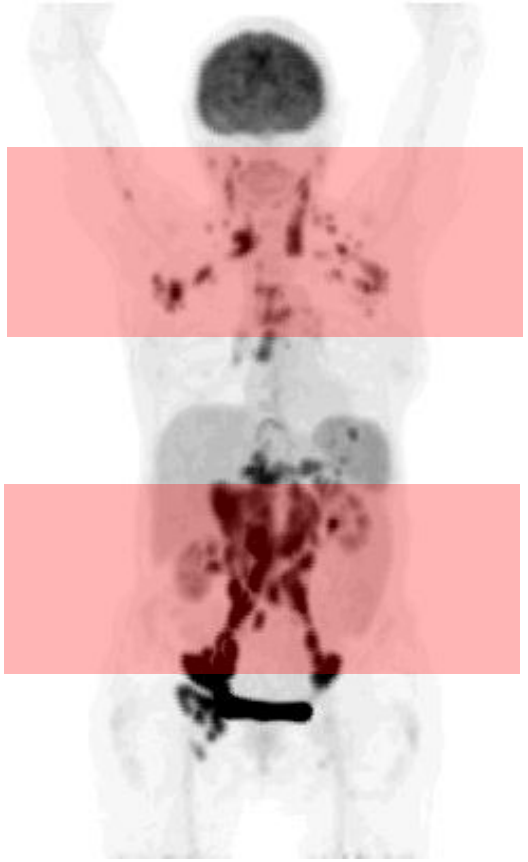
We are able to target specific cancers and destroy them with a persons own re-programmed immune system





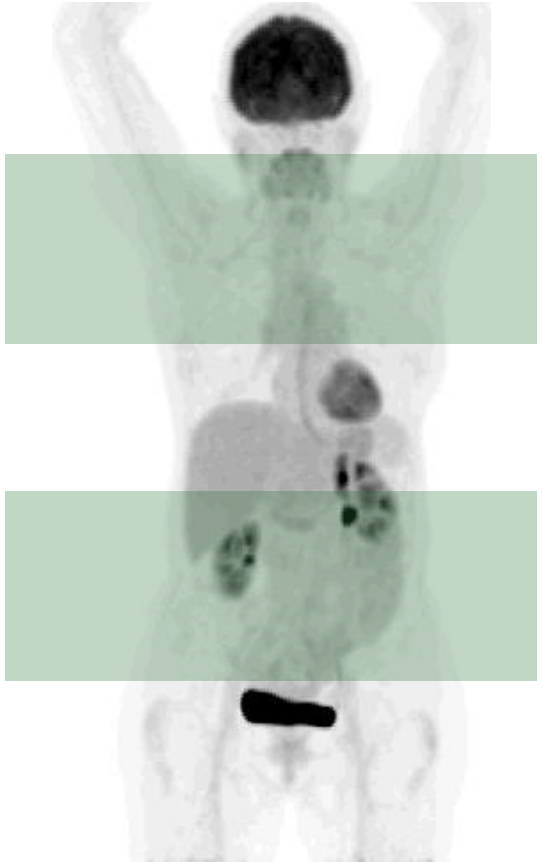
Tumour-Specific Antigens
(Primary: CD19)

BEFORE TREATMENT

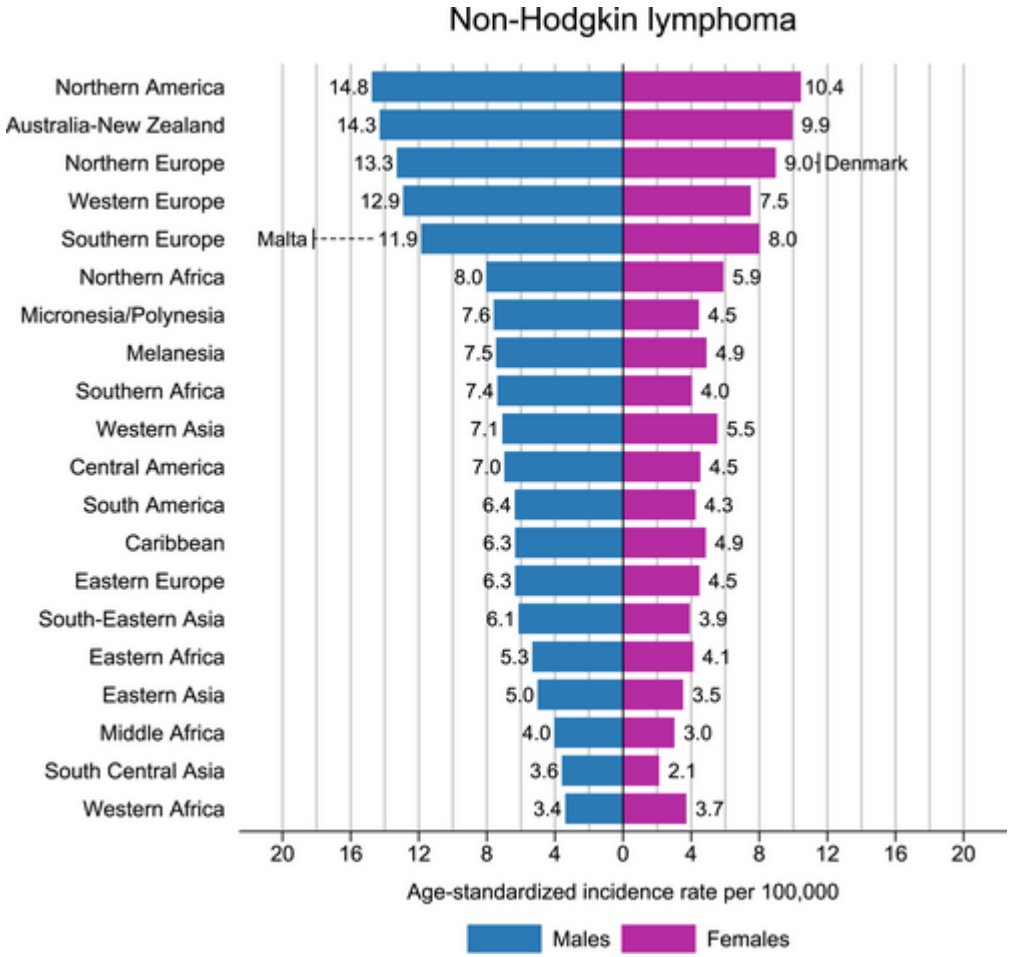


Areas of increased metabolic activity (radiotracer uptake) as a result of DLBCL and a heavy disease burden in both the upper body and lower abdomen

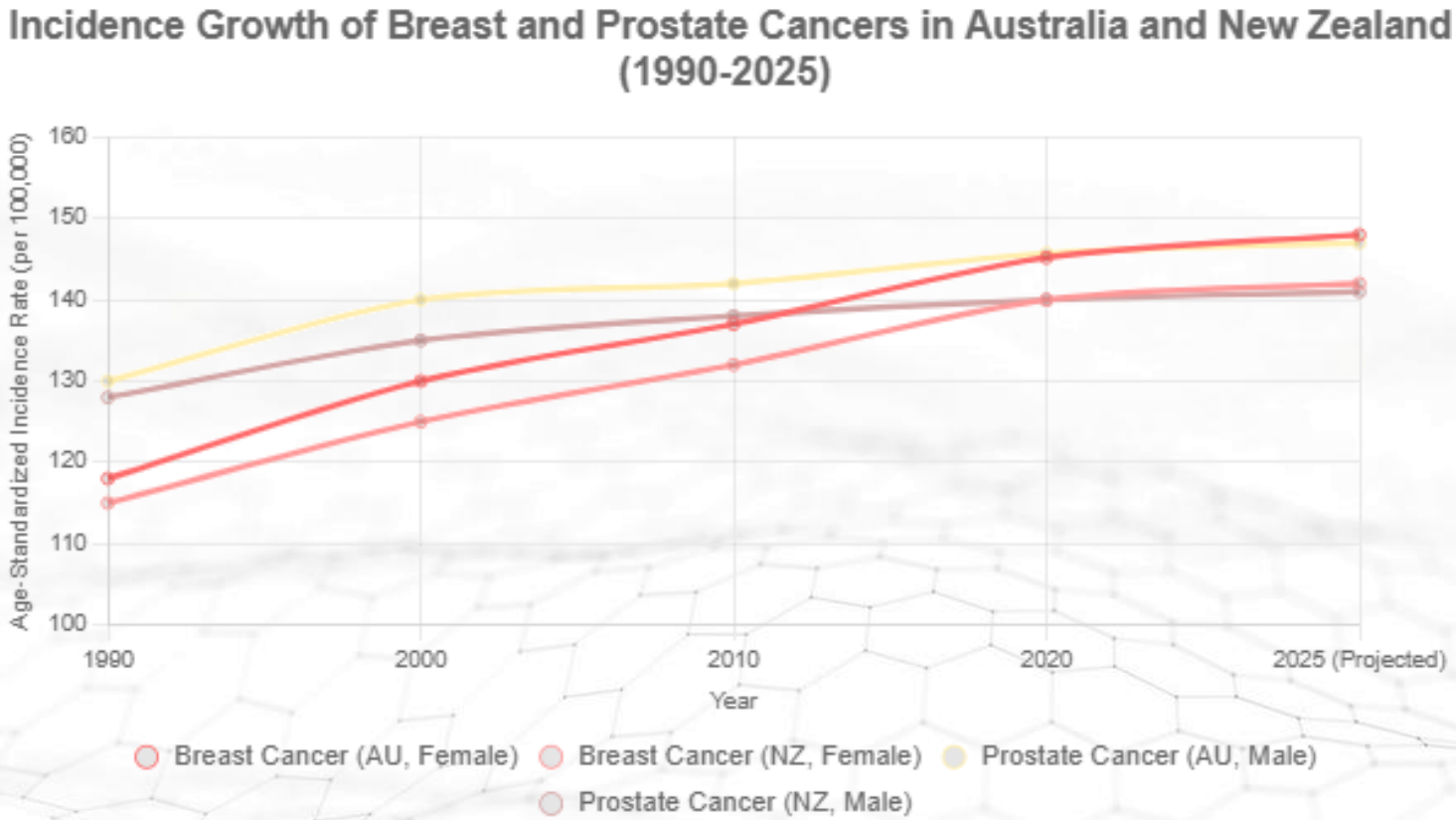
AFTER TREATMENT



Complete response within 3 months of infusion with eradication of disease in affected organs (dark areas are normal residual tracer uptake in the bladder, kidneys)



WHAT CAN WE HOPE TO DO TOMORROW?



Breast Cancer: Highest incidence in females in both countries, with Australia and New Zealand recording the world's highest rates.

Lung Cancer: A leading cause of cancer mortality, with notable incidence in both genders and rising trends in women.

Colorectal Cancer: Significant burden, with early-onset cases increasing, particularly in New Zealand.

Prostate Cancer: Dominant in males, with sharp rises in early-onset cases in Australia.

Utilising AI for better patient outcomes

THERE ARE 5 COMPONENTS TO OUR AI STRATEGY

Patient Selection and Trial Optimization

Utilise patient genomic data to optimize patient selection and trial recruitment

Pharmacodynamic and Safety Monitoring

Utilise clinical data to predict and eliminate CRS and ICANS for safer patient delivery

Pricing and Market Access Selection

Real-time review of global pricing and developments to maintain market access superiority

Operational Efficiency in Manufacturing and Compliance

Production processes optimised for compliance and efficiency to reduce cost to produce

Predictive Dosing Models for Personalised Delivery

Tailored dosing using patient data for efficacy and safety improvements

HOW CAN WE EMPLOY QUANTUM IN CANCER RESEARCH?

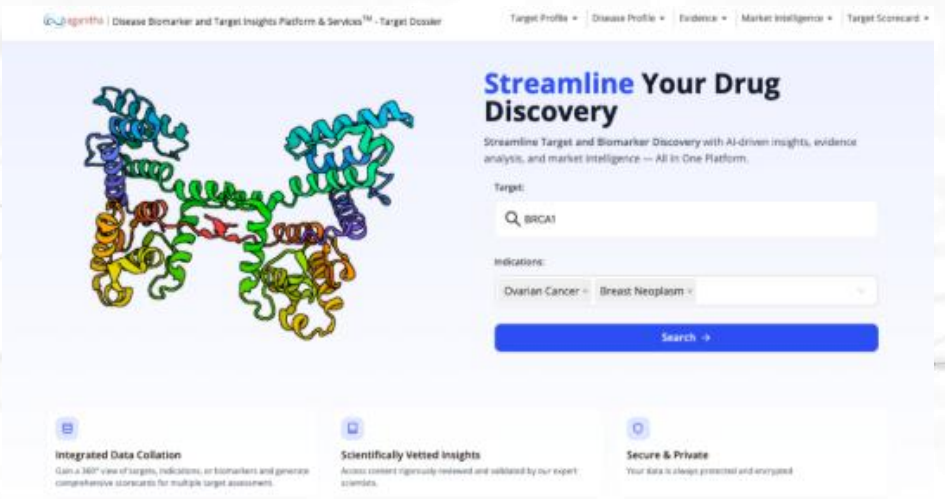
Enhanced Antigen Discovery in Heterogeneous Solid Tumors:

Quantum computing can exponentially speed up the identification of tumor-specific antigens (TSAs) or neoantigens from vast genomic datasets, addressing the antigen heterogeneity in solid tumors like breast or pancreatic cancer, where classical methods struggle with variability.

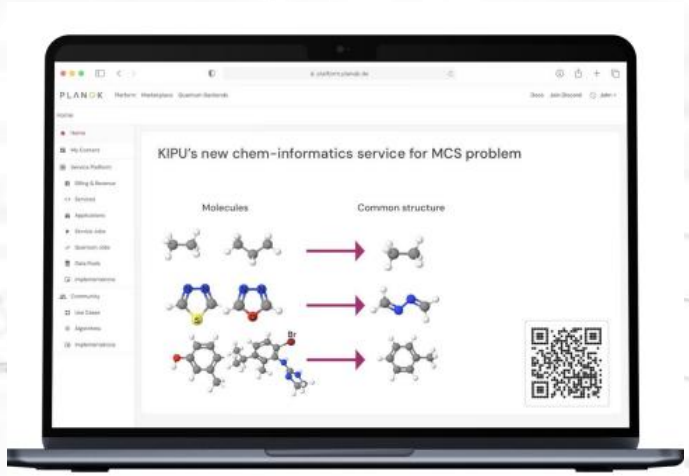
The development of quantum machine learning (QML) for biomarker discovery, particularly in the context of quantum-accelerated genomics for personalized immunotherapy, involves several key players:

aganitha

KIPU QUANTUM



Target and Biomarker Research

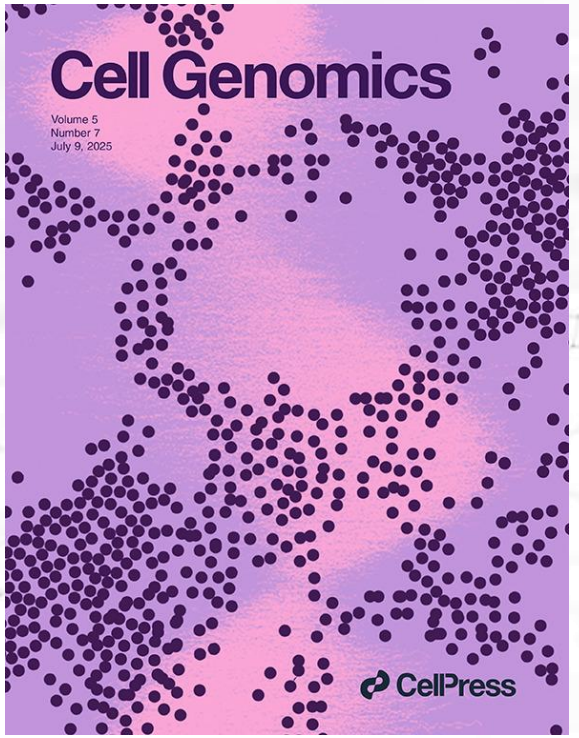


Molecular screening

HOW CAN WE EMPLOY QUANTUM IN CANCER RESEARCH?

Modeling Tumor Microenvironment (TME) Interactions:

Variational quantum eigensolvers (VQE) enable precise simulations of molecular dynamics in immunosuppressive TMEs, allowing design of CARs with domains (e.g., TLR2-like) that enhance T-cell infiltration and resistance to exhaustion. Current developments include quantum simulations for tumor modeling and therapy resistance prediction, applied to solid tumors like gliomas in 2025 hybrid quantum-classical frameworks.



University of Pennsylvania, known for pioneering CAR T-cell therapies, are exploring quantum simulations for immunotherapy applications. A 2025 study in Cell Genomics highlights their use of VQE to model DNA-protein interactions in the TME, aiming to design CARs with enhanced infiltration capabilities for solid tumours like gliomas.

Prof. Carl June

Independent Clinical Expert, BioOra Limited

Inventor of CAR T-cell therapy, world's leading expert on immunotherapy (UPenn)

HOW CAN WE EMPLOY QUANTUM IN CANCER RESEARCH?

Optimizing CAR Modular Structures for Persistence:

Quantum approximate optimization algorithms (QAOA) can solve combinatorial problems in assembling CAR domains (e.g., co-stimulatory elements for better endurance in hypoxic solid tumors), improving efficacy against barriers like poor vascularization. This is emerging in 2025 quantum optimization for radiotherapy and drug response in oncology, extensible to CAR engineering.

Predicting Cytotoxicity & Toxicity via Quantum Machine Learning:

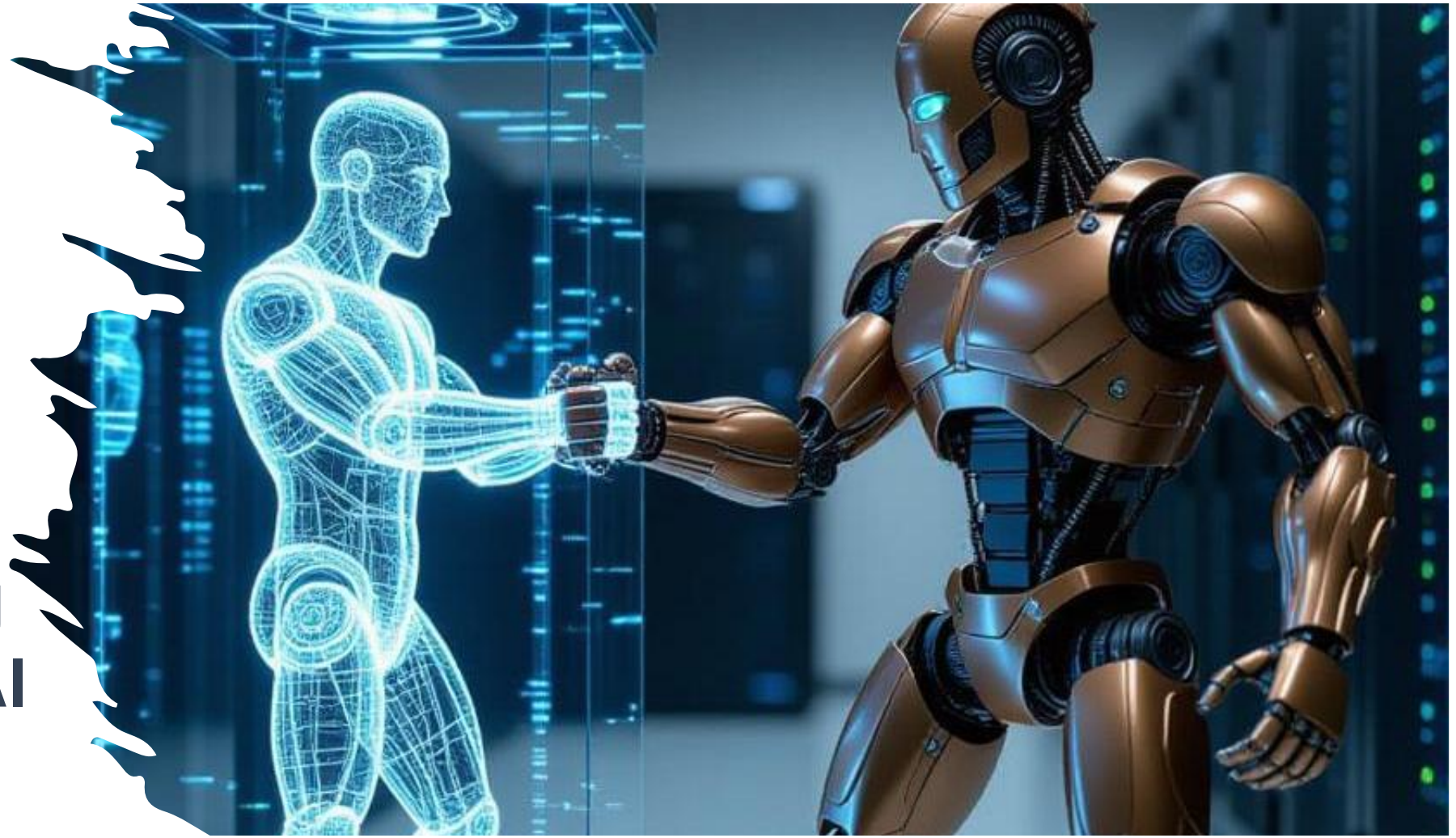
QML models, such as projected quantum kernels, classify CAR T phenotypes and predict side effects like cytokine storms in solid tumor contexts, enabling safer designs for tumors with dense stroma. Developments in 2025 include QNNs for classifying solid tumors (e.g., brain metastases) and hybrid models improving drug response prediction by 15%.

Accelerating Clinical Trial Design & Cohort Selection:

Quantum optimization transforms site selection, patient stratification, and *in silico* trials for CAR T in solid tumors, reducing timelines for testing novel constructs against resistant cancers. As of 2025, quantum approaches are in use for clinical trial simulations in oncology, including cohort identification for personalized therapies.

WHO WILL BE THE WINNER IN THE NEW SPACE RACE?

Quantum computing will outshines AI by solving complex problems exponentially faster, unlocking breakthroughs AI can't touch.



Bioora

www.bioora.com

John Robson
MANAGING DIRECTOR

John.Robson@bioora.com
+64 21 842 960