

Discover the drugs that your AI can't.

Advancing rare disease drug discovery and personalised cancer vaccines. Quantum-accelerated generative AI finds the candidates classical models miss, validated in vitro across all tested alleles.

PEPTIDE DESIGN

1. The drug discovery bottleneck

Every discovery programme hits the same constraint: the early screening funnel is too narrow. Classical generative models cluster around known chemical space, missing the structural diversity that leads to novel hits. With 90% of candidates failing in clinical trials, a new drug costs more than \$2 billion to bring to market.

Rare disease immunotherapy and personalised cancer vaccines are chronically underserved, the very alleles where training data is scarcest.

2. The value that ORCA delivers

ORCA replaces the classical prior with a quantum prior from the PT-2 photonic quantum accelerator, exploring more of the chemical space that matters in every generation cycle. It works alongside your current workflow: same models, same training, same Python frameworks. Only the diversity and quality of what comes out changes. More diverse candidates and more confirmed binders per cycle (with potent binding validated in vitro across all tested alleles) mean more drug leads.

3. In-vitro results

The Technical University of Denmark (DTU), in partnership with ORCA Computing, designed peptides that were confirmed as potent binders by wet-lab ELISA across all three tested alleles. Confirmed binders are drug leads: these were physically tested, and they bound.

“Being able to bring quantum computing alongside classical methods opens up far more of that space to search, and the next step is to scale this up with more advanced models and more computational power, towards the discovery of vaccines and treatments.”

Timothy P. Jenkins, Associate Professor, Department of Biotechnology and Biomedicine at DTU

~2X

more strong binders on rare disease alleles — where classical AI fails most

79%

of quantum-designed peptides confirmed as potent binders in vitro across 3 validated alleles

USE-CASE IMPLEMENTATION

Hybrid solution

PT-2 photonic quantum accelerator (48 qumodes)

Classical HPC with NVIDIA GPUs

ORCA SDK with Python and PyTorch compatibility

AI approach

Quantum-accelerated generative model for peptide design