

Researchers use virtual reality to unpack causes of common diseases

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Credit: University of Oxford

Researchers from the University of Oxford are using a unique blend of virtual reality and innovative genetic techniques to understand the causes of diseases such as diabetes and anaemia.

The team, working in collaboration with physicists from Università di Napoli and software developers and artists at Goldsmiths, University of London, are using the state-of-the-art technology to investigate the 3-D structure of DNA. The way in which DNA is arranged in 3-D space has

huge consequences for human health and disease. Subtle changes in DNA folding impact on whether genes can be switched on or off at particular times – dictating what a cell can do. It is this process that the team are trying to get to the bottom of in the hunt for the causes of disease, and potential new treatments.

The scientists are presenting their research at the Royal Society's annual Summer Science Exhibition.

Prof Jim Hughes, Associate Professor of Genome Biology, University of Oxford, said: "It's becoming increasingly apparent that the way that a cell fits two metres of DNA into a structure more than ten times smaller than a human hair, is more than just a random process. We are dissecting this intricate folding to understand which parts of our immense genome are interacting at any one time, helping us understand whether changes in this process can cause disease."

CSynth – the software on show at the Royal Society's Summer Science Exhibition – is designed to provide an engaging way to explore and understand the complex structure of the genome in 3-D, by integrating data from genome sequencing, computer modelling and high powered microscopy. Scientists are now hoping to use [virtual reality](#) to visualise the huge amounts of data they can generate in the laboratory.

Speaking about the software, Stephen Taylor, Head of the Computational Biology Research Group at the MRC Weatherall Institute of Molecular Medicine, University of Oxford, said: "With advances in genetic techniques, we can now harness more information than ever before from biological data provided by patients and volunteers. With the CSynth software we can integrate data from different experiments into something more tangible to help researchers understand how DNA folds. In addition, using the Virtual Reality mode in CSynth is helping us visualise these complex 3-D structures in a more intuitive way."

Prof William Latham from the Department of Computing, Goldsmiths, University of London, said: "I'm fascinated by the way we can use art to better understand and envision scientific concepts. In CSynth we've created something that not only accelerates research progress, but also allows the public to share in unravelling some of the mesmerising and intricate structures inside our body."

Prof Frederic Fol Leymarie from Goldsmiths, said: "By combining maths and physics together with computer games technologies, we can program realistic molecular interactions, and immerse people in the dynamic world of DNA. CSynth takes you on a close encounter with the very fabric of life."

Provided by University of Oxford

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