DNA breakthrough could identify why some are more affected by COVID-19

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Scientists from the MRC Weatherall Institute of Molecular Medicine at Oxford University have developed a method that allows them to see, with far greater accuracy, how DNA forms large scale structures within

a cell nucleus.

This breakthrough will improve understanding of how differences in DNA sequences can lead to increased risks of developing many different diseases.

The method, which is around 1000 times more accurate than existing techniques, enables scientists to measure the contacts between different pieces of DNA, which are a million base pairs apart to the nearest base pair. This is the equivalent of being able to measure contacts in the DNA fiber that are 1km apart to the nearest millimeter.

Put another way, if each letter of DNA was the size of a brick, each cell would contain roughly the number of bricks in a city (6 billion). Scientists are now able to work out which bricks are next to each other, and see the fine details of how DNA forms structures inside cells, when previously they could only see the DNA "architecture" on the scale of small buildings.

Associate Professor James Davies, the MRC clinician scientist at the Radcliffe Department of Medicine who led the research, explains, "This technique has real potential to make a significant impact on human health. For example, at the moment we know that there is a genetic variant which doubles the risk of being severely affected by COVID-19. However, we do not know how the genetic variant makes people more vulnerable to COVID-19.

"This new breakthrough is helping us to work out how this causes severe COVID and which genes are involved. This is important because we know that drugs which are developed to targets with this type of genetic evidence have double the chance of making it past early stage clinical trials. The team is now using the technique to make the genetic identification and hopes to report on results in coming weeks."

Provided by University of Oxford