NTU scientists map key part of human DNA associated with ageing and cancer

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SINGAPORE – In a world first, scientists from Nanyang Technological University (NTU) have mapped out the molecular construction of a key part of human chromosomes known as telomeres.

Their work paves the way in which for a deeper understanding of longevity, and the event of higher anti-cancer medicine.

Telomeres are protecting caps on the ends of chromosomes, that are made of DNA and proteins.

Like the plastic recommendations on the ends of shoelaces, the telomeres cap and defend the ends of the chromosome from injury. Telomeres additionally shorten each time a cell divides, until they now not can – and the method is linked to ageing and cancer.

The researchers' advance in genetic analysis was revealed in September within the journal Nature, after eight years of work.

The analysis workforce discovered that telomeres are usually not structured within the zig-zag formation as depicted in textbooks, however quite in columns and a spring formation.

This leaves a part of the DNA uncovered and unprotected, making it extra prone to break than beforehand thought, Professor Lars Nordenskiold, the chair of NTU's School of Biological Sciences who led the workforce of 11 within the examine, advised a media briefing on Thursday.

The discovery will assist researchers perceive how telomeres, regardless of their important position in stopping injury to DNA, are themselves hotspots for DNA injury, mentioned Prof Nordenskiold.

Dr Aghil Soman, an NTU analysis fellow who co-authored the examine, emphasised that the genetic mannequin had been derived from natural human DNA, as a substitute of synthetic DNA generally utilized in such research for its extra steady properties.

“It is the primary perception of the telomeric chromatin construction which has been lacking for many years. It is a form of a black field for an extended, very long time.

“It also provided the first insight into how telomeric DNA is being packaged in our body,” mentioned Dr Soman.

The researchers added that earlier research into the construction of telomeric DNA stalled as a result of challenges of replicating it, owing to its chemical instability and repetitive nature.

However, they overcame this by bettering on the prevailing technique of replicating DNA in Escherichia coli (E. coli) micro organism in order that it could work for human telomeres and create chains of telomeric DNA lengthy sufficient for a full image of its construction, they mentioned.