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Through laboratory investigations, the research team from Nanyang Technological University, Singapore (NTU) discovered how the prominent compound, known as epigallocatechin gallate (EGCG), can inhibit the growth of a tuberculosis-causing bacteria strain.

The EGCG does so by binding to an enzyme that provides biological energy for cellular activity. The process results in a dip in the amount of energy the bacteria has for its cellular processes vital for growth and stability, such as cell wall formation.

"Our discovery of the EGCG's ability to inhibit the growth of M. tuberculosis will allow us to look at how we can improve the potency of this compound in green tea, and other similar
compounds, to develop new drugs to tackle this airborne disease," said study lead researcher Gerhard Gruber, Professor at NTU.

According to the researchers, cells require energy for vital processes such as cell wall formation to take place. They get their energy from an energy storage molecule made by an enzyme called Adenosine triphosphate (ATP) synthase.

Without energy for essential cellular activity, a cell loses its stability and eventually dies. To determine the factors affecting the production of ATP synthase, and thus, the amount of energy a bacterial cell has for growth, the research team studied mycobacterium smegmatis and mycobacterium bovis, both of which belong to the same family as M. tuberculosis.

These mycobacterial strains share a similar structural composition.

The team first found that alterations to the genetic code for ATP synthase resulted in an enzyme that produced fewer energy storage molecules in the bacterial cells, slower cell growth, and an altered colony shape.

With this data, the scientists then screened for and found 20 compounds that could possibly bind to ATP synthase and cause the same blocking effect, and then tested them for their efficacy.

Only EGCG, a natural antioxidant that occurs in a large amount in green tea, showed it had the same crucial effect of reducing energy storage molecules in the bacterial cell, the study said.

The research team is now looking at optimising the activity of EGCG for increased efficiency and potency in fighting the tuberculosis bacteria.

Their ultimate goal is to develop a drug cocktail that will tackle multi-drug resistant tuberculosis. The findings, published in the journal Scientific Reports, could pave the way for the creation of novel drugs to combat tuberculosis, one of the most deadly infectious diseases in the world.