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Indian scientists discover a novel approach to cancer drug discovery

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This approach helps in rapid identification of potential DNA binding molecules for cancer therapy.



Scientists at the Indian Association for the Cultivation of Science (IACS), Jadavpur, Kolkata, have used a novel approach to drug discovery by attaching or linking a DNA sequence of interest to gold-coated magnetic nanoparticles and picking those molecules that target and bind to the DNA sequence for further study. This approach helps in rapid identification of potential DNA binding molecules for cancer therapy.

The traditional approach is to synthesize compounds and study their interactions with drug targets before choosing the best drug molecules. This is both time consuming and laborious.

So, a team of researchers at IACS first immobilised G-quadruplex DNA on to gold-coated magnetic nanoparticles and left the target in a solution containing azide and alkyne functional groups. Since G-quadruplexes are involved in regulation of the gene expression, there is increased interest in finding molecules that target them.

The azide and alkyne fragments that are capable of binding to the adjacent sites of the G-quadruplex react with each other to produce triazole products. The researchers found that of the three triazole compounds that selectively bound to the G-quadruplex target, one (Tz 1) was found in large proportion and was the only molecule that was obtained when the nanoparticle was recycled for the fourth and fifth time.

Based on the extremely high cellular activity of identified drug compound, researchers believe that this methodology using DNA nano-template allows easy synthesis of high-affinity drug molecules for the target DNA without performing any conventional drug synthesis procedures.