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Chemistry for pharmaceuticals wins Nobel Prize 2022

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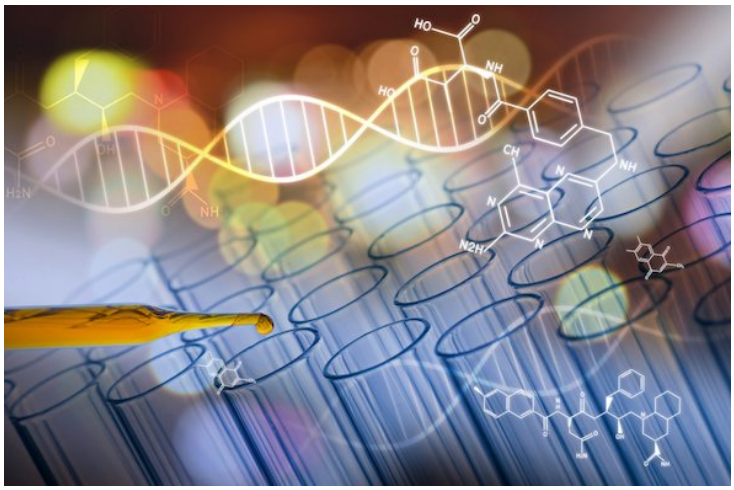
Click chemistry and bioorthogonal reactions have taken chemistry into the era of functionalism



The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Chemistry 2022 to a trio- Carolyn R. Bertozzi, Stanford University, CA, USA; Morten Meldal, University of Copenhagen, Denmark; and K. Barry Sharpless, Scripps Research, La Jolla, CA, USA; for the development of click chemistry and bioorthogonal chemistry.

Barry Sharpless, who is now being awarded his second Nobel Prize in Chemistry, started the ball rolling. Around the year 2000, he coined the concept of click chemistry, which is a form of simple and reliable chemistry, where reactions occur quickly and unwanted by-products are avoided.

Shortly afterwards, Morten Meldal and Barry Sharpless, independently of each other, presented what is now the crown jewel of click chemistry: the copper catalysed azide-alkyne cycloaddition. This is an elegant and efficient chemical reaction that is now in widespread use. Among many other uses, it is utilised in the development of pharmaceuticals, for mapping DNA and creating materials that are more fit for purpose.

Carolyn Bertozzi took click chemistry to a new level. To map important but elusive biomolecules on the surface of cells – glycans – she developed click reactions that work inside living organisms. Her bioorthogonal reactions take place without disrupting the normal chemistry of the cell.

These reactions are now used globally to explore cells and track biological processes. Using bioorthogonal reactions, researchers have improved the targeting of cancer pharmaceuticals, which are now being tested in clinical trials.