Intelligence unchained in biotech

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ARTIFICIAL intelligence is quietly rewriting the rules of biotechnology, shifting the grind of scientific trial-and-error from crowded laboratories to lines of code. What once demanded years of wet-lab experimentation can now be explored through simulations, allowing researchers to test ideas at a speed and scale that would have been unthinkable a decade ago.

The shift is most evident in drug discovery, where a process once reliant on testing tens of thousands of molecules in the lab is becoming increasingly computational. AI models trained on biological, chemical and genetic data can predict promising compounds early, filtering out failures before they reach wet labs and compressing years of experimentation into days or weeks.

AI's strongest impact is in early-stage drug discovery, where it helps identify biological targets, predict protein binding and optimise compounds for safety and stability. Its use is also expanding into genomics, precision medicine and pharmaceutical manufacturing, improving DNA analysis, therapy matching, yields and quality control.

According to Kanneganti Ramarao, chief technology officer at Aganitha Cognitive Solutions, "AI is no longer a peripheral tool in biotechnology but a necessity. As drug-resistant bacteria rise, diseases grow more complex and precision medicine becomes mainstream, traditional methods struggle to keep pace. In some areas, we will be forced to use AI because there is no other way."

Beyond infectious diseases, AI promises personalised therapies tailored to genetics, but regulation lags. "The science is moving faster than the process," Ramarao notes, adding that trial reforms will shape adoption.

Fully autonomous AI drug design remains unlikely, with human judgment and safety oversight essential. In practice, AI acts as a powerful collaborator, rapidly analysing vast datasets and generating insights at unprecedented speed.