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IIT Kanpur paves way for new drugs against infectious diseases

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Discovery can lead the way in combating drug-resistant infections and advancing the fight against diseases like malaria and HIV



A research team from the Indian Institute of Technology Kanpur (IIT-K), led by Prof. Arun K. Shukla of the Department of Biological Sciences and Bioengineering, has made a significant scientific breakthrough with the first-ever visualisation of the complete structure of the Duffy antigen receptor.

This receptor protein, found on the surface of red blood cells and other cells in the human body acts as a gateway into the cell, facilitating infections by destructive pathogens like the malaria parasite, Plasmodium vivax and the bacterium, Staphylococcus aureus.

Prof. Arun K. Shukla, Department of Biological Sciences and Bioengineering at IIT Kanpur said, “While the Duffy antigen receptor is common in most populations, a significant percentage of people of African descent do not produce the Duffy receptor on their red blood cells due to a genetic variation. This makes them naturally resistant to certain types of malaria parasites that rely on that specific ‘gateway’ to infect those cells. This shows how important the Duffy antigen receptor is for these diseases and how targeting it could lead to new treatments.”

The research team led employed state-of-the-art cryogenic-electron microscopy (cryo-EM) to unveil the intricate architecture of the Duffy antigen receptor, throwing new light on the Duffy receptor's unique structural features and distinguishing it from similar receptors in the human body. This detailed understanding will be crucial in the designing of highly targeted therapies that can effectively block infections without causing unwanted side effects.