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IIT-K unravels key drug target receptor for cancer and respiratory disease treatments

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A team of researchers from the Department of Biological Sciences and Bioengineering at the Indian Institute of Technology, Kanpur (IIT-K) has successfully visualised the atomic structure of CXCR2, a key human receptor involved in cancer progression and respiratory disorders. This discovery, published in the journal Molecular Cell, paves the way for developing novel therapeutics targeting this critical molecule.

Using advanced cryogenic-electron microscopy (cryo-EM), the IIT Kanpur research team has provided unprecedented insight into the lock-and-key mechanism that allows CXCR2 to recognise multiple chemokines. This breakthrough addresses a fundamental question in biomedical science regarding how multiple chemokines bind and activate a common receptor, while also opening up the possibility of using the structure as a template to design new molecules of therapeutic value.

"Our findings provide a molecular blueprint for designing next-generation therapeutics that can precisely target CXCR2 and potentially reduce its role in cancer and respiratory diseases. By visualising this receptor in its active state, we now have the opportunity to develop highly specific inhibitors that can disrupt its function, potentially leading to significant advancements in treatment strategies," said Professor Arun Kumar Shukla, lead investigator of the study at IIT Kanpur.

Following this breakthrough, the team has begun developing novel therapeutics, including small molecules and antibodies targeting this receptor. These will undergo laboratory testing, followed by animal studies, bringing IIT Kanpur one step closer to pioneering innovative treatment solutions for cancer and respiratory diseases. This achievement highlights IIT Kanpur’s ongoing commitment to cutting-edge research that drives global healthcare and biomedical innovation.