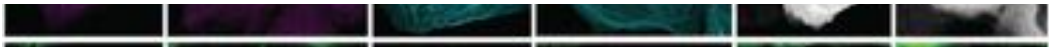
DBT-InStem scientists develop a sensor that could help identify new drugs

New Delhi, Sep 22: Microtubules are cytoskeleton polymers made of alpha/beta tubulin subunits that perform a variety of cellular functions such as chromosome segregation, intracellular cargo transport, and maintaining cell shape and organization. Many of these microtubule functions are regulated by post-translational modifications (PTMs) that occur in the tubulin subunits. A key limitation in understanding microtubule PTMs in these processes is the lack of tools to study their spatial-temporal organization.

Dr. Minhaj Sirajuddin's laboratory at the cytoskeleton lab in the Cardiovascular Biology and Disease theme at DBT- Institute for Stem Cell Science & Regenerative Medicine (inStem) has developed and validated a live cell sensor against tyrosinated form of microtubules a unique microtubule PTM.



The group used a yeast display library to identify a binder against terminal tyrosine of α-tubulin, a unique PTM site. Extensive characterization has validated the robustness and non-perturbing nature of the binder as a tyrosination sensor, a live-cell tubulin nanobody specific towards tyrosinated microtubules. The tyrosination sensor reported in this study is the first tubulin nanobody or sensor that can be used to study microtubules PTMs in live cells. Their research work has also shown the application of this sensor for studying small-molecule (anti-cancer drugs) compounds that target microtubules. Thus, this sensor will facilitate studying microtubule functions for many researchers and will aid identifying new drugs of therapeutic value in future. Further, provisional patenting application has been filed for the commercial use of tyrosination specific sensor; jointly by inStem, Bangalore, India and North Carolina State University, Rayleigh, USA.The work has been published recently in Rockefeller University Press's Journal of Cell Biology (Sept 2020) titled 'Genetically encoded live-cell sensor for tyrosinated microtubules.'

Reference:

Kesarwani S., Lama P., Chandra A., Reddy P. P., Jijumon A. S., Bodakuntla S., Rao B. M., Janke C., Das R., Sirajuddin M. (2020) Genetically encoded live-cell sensor for tyrosinated microtubules. Journal of Cell Biology (IF-7.432)
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