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Nanobodies in Advanced Flourescent Microscopy

Friday 26 September 2025 11:00 (1h 30m)

Advanced microscopy techniques are continually redefining how we study biological systems, offering unprecedented spatial and temporal resolution. In super-resolution fluorescence microscopy, spatial resolution can reach the scale of tens of nanometers. However, as optical resolution improves, molecular labeling is increasingly becoming the limiting factor.

In this talk, we will focus on how nanobodies, small, monovalent, single-domain antibody fragments, can overcome key limitations of conventional labeling approaches such as fluorescent proteins and standard antibodies. Their compact size (~15 kDa) minimizes linkage error, while their monovalency prevents artificial clustering or crosslinking of target molecules, an essential feature for quantitative imaging and live-cell compatibility.

Nanobodies can be efficiently expressed in E. coli and customized with labeling tags, allowing for functionalization (organic dyes, click chemistry groups). This enables detailed biophysical characterization, including the determination of binding kinetics or saturation concentration, which are critical for developing robust, reproducible labeling protocols.

Finally, we will highlight validated, ready-to-use nanobody systems such as anti-GFP and anti-ALFA-tag binders, which offer plug-and-play solutions without the need for custom nanobody generation.

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Track Classification: Structural and Imaging Applications