A COLLECTION OF FLUORESCENT PROBES FOR TRANSLATIONAL BIOIMAGING

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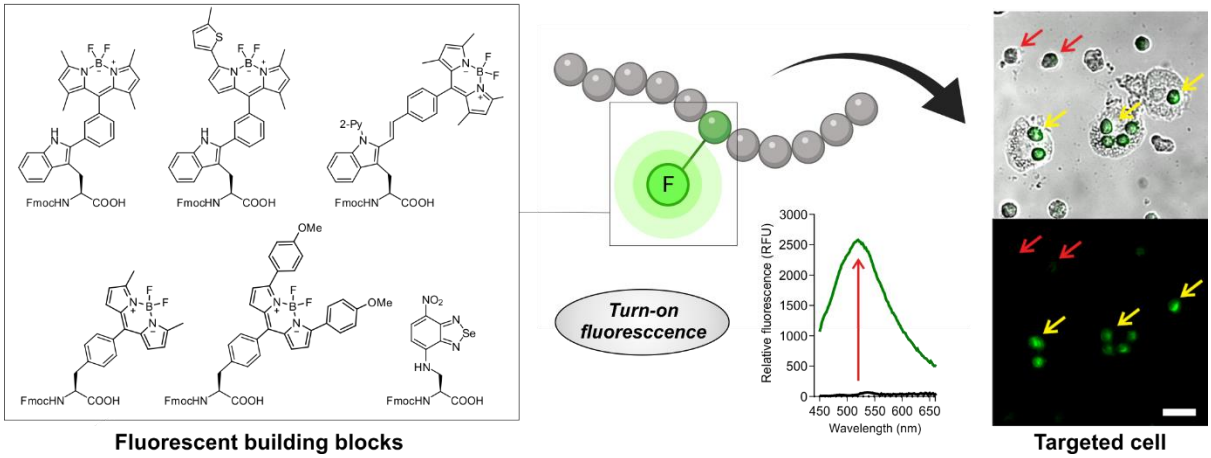
Fluorescent activatable probes are valuable tools for live-cell imaging because of their tunability and target specificity.[1] Over the last few years, our group has designed a collection of fluorogenic amino acids and peptides for high-resolution biological imaging and translational medicine, which was recognised with the RSC Bader Prize 2023. Our team have demonstrated that this approach can be used to generate probes to visualize infectious pathogens (e.g., fungal pathogens in *ex vivo* human lung tissue[2]) and subsets of immune cells in live cells and *in vivo*[3] and in *ex vivo* human biopsies.[4] We have designed our fluorescent amino acids to: 1) be compatible with conventional solid-phase peptide synthesis, 2) maintain the biomolecular recognition features of the native peptides and 3) emit fluorescence preferentially after target binding, improving signal-to-noise ratios for imaging. Furthermore, we have reported fluorogenic analogues with emission >600 nm to prepare of cyclic peptides for imaging tumor cells using multiphoton imaging *in vivo*.[5] Recently, we have extended the toolbox with smaller amino acids, which include the first phenylalanine-based fluorogenic building blocks for detection of urinary tract *Candida* infections,[6] the smallest turn-on fluorescent amino acids for peptide-PAINT imaging and super-resolution microscopy,[7] and to fluorogenic tags for small proteins associated with immune cell function like interleukins.[8] Finally, the talk will also briefly discuss our efforts to establish apply these fluorescent probes for clinical applications.



Selected references:

[1] Cheng, Z. et al. Nat. Rev. Chem. **2020**, 4, 275.
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[5] a) Subiros-Funosas, R. et. al. Chem. Sci. **2020**, 11, 1368; b) Barth N. et al. Angew. Chem. Int. Ed. **2022**, 61, e20211302.
[6] Mendive-Tapia et al. Angew. Chem. Int. Ed. **2022**, 61, e202117218.
[7] De Moliner et al. Angew. Chem. Int. Ed. **2023**, 62, e202216231.
[8] Reese et al. ACS Cent. Sci. **2024**, 10, 143.