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Webinar

Development of Fc-Fusion mimetic

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The development of therapeutic proteins, particularly Fc-fusion proteins, has significantly advanced the treatment of many chronic diseases, including autoimmune disorders, cancers, and ocular diseases. Fc-fusion proteins combine the functional domain of a biologically active protein with the Fc region of an antibody. They offer therapeutic advantages through bivalency similar to IgGs, but they can be difficult to produce during early preclinical research and to scale for production. They are also prone to aggregation during downstream processing and have similar stability concerns as IgGs. In certain therapeutic contexts, such as organ-specific applications like ocular treatments, the Fc region may be unnecessary or even detrimental, particularly in managing inflammatory conditions. This highlights the need for alternative formats that retain the benefits of Fc-fusion proteins while addressing their limitations.

This study evaluates the storage stability and solution binding affinity of a novel Fc-fusion mimetic, receptor-PEG-receptor (RpR) (Figure 1), designed to address limitations of the current therapeutic aflibercept, a gold-standard therapy for age-macular degeneration (AMD). Using di(bis-sulfone) PEG linker as a structural scaffold, the mimetic aims to improve the storage stability and binding efficacy of the Fc fusion protein. Mass photometry and size-exclusion chromatography demonstrated that RpR, even in an unformulated buffer, exhibits superior storage stability exceeding 10 months compared to aflibercept. Furthermore, microscale thermophoresis was employed to determine RpR's binding affinity to VEGF in solution, providing a more physiologically relevant assessment than traditional binding assays. These findings highlight RpR's potential as a therapeutic candidate for the treatment of AMD disease, warranting further investigation.

What will the audience take away from your presentation? (Try to list 3-5 specific items)

- Learn about different formats of antibody-based medicine
- Learn about antibody mimetics and the reason for their development
- Learn on bispecific format for antibody-based medicine
- Learn on application of biologics for ocular indications such as ocular inflammation

Biography

Hanieh Khalili is an Associate Professor specializing in biotherapeutic drug development and formulation. Her research focuses on creating novel antibody-based medicines for chronic diseases, with an emphasis on ocular conditions. After earning her PhD from University College London (UCL), she conducted postdoctoral research at the UCL Institute of Ophthalmology. She later joined the University of East London and now leads the Biotherapeutic Drug Development group with 15 members (including Final year students and PhDs) at the University of West London. She has dedicated to translating research into improved treatments and enhancing drug delivery systems for better patient outcomes. She actively publishes, peer reviews, and presents at conferences, sharing her expertise with a growing network in academia and industry

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