

# SCIENTIFIC SEMINAR



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CIC bioGUNE

## *Development of saponin-based synthetic adjuvants and molecular vaccines*

Current subunit vaccines based on well-defined molecular antigens offer improved safety and more precise targeting than whole-pathogen vaccines. However, they are inherently less immunogenic and require coadministration with an adjuvant to increase antigen immunogenicity and potentiate the immune response. QS-21 is a saponin natural product adjuvant extracted from the *Quillaja saponaria* (QS) tree that has been recently approved as part of a combination system within the malaria and shingles vaccines. However, natural QS-21 suffers from scarcity, heterogeneity, hydrolytic instability, and dose-limiting toxicity, which has hindered its further widespread clinical use as a stand-alone adjuvant. In addressing these challenges, we have identified critical structure-activity relationships of the QS saponin class that have led to optimized synthetic saponin adjuvants [Pifferi et al., *Nat Rev Chem* 2021, 5, 197]. In this talk, I will present our latest studies on the development of new streamlined saponin variants with minimal and optimal structural elements for adjuvant activity, which elicited potent antibody responses in mice without appreciable toxicity [Ghirardello et al. *Chem Comm* 2020, 56, 719; Fuentes et al. In revision]. Leveraging our privileged synthetic saponin scaffold, we have chemically conjugated tumor-associated carbohydrate antigens to our novel adjuvant platform [Fuentes et al. *Chem Commun* 2021, 57, 11382], leading to a new class of saponin-based molecular constructs with potential for anti-cancer vaccine development.

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Friday  
March 18  
**ATRIO 800.**  
**11.00H**



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