Science Café

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A PLUG-AND-PLAY, MODULAR, CARRIER-AGNOSTIC IMMUNOSTIMULATION PLATFORM FOR MRNA VACCINES

Summary

mRNA vaccines can rapidly encode diverse tumor antigens and drive strong T cell responses, but their efficacy depends on properly balanced innate immune activation: too little activation yields weak dendritic-cell priming, too much can suppress translation.
We introduce an RNA engineering approach that attaches short dsRNA "teeth" to antigen encoding mRNA, providing built in RIG I–mediated adjuvanticity. This dsRNA-tethered mRNA integrates into existing delivery systems with minimal changes, and the number and properties of dsRNA teeth can be tuned to adjust immunostimulation while maintaining expression. Optimized constructs activated murine and human dendritic cells and induced broad pro inflammatory cytokines. In tumor models, dsRNA-tethered mRNA enhanced antitumor immunity across multiple formulations, including anionic lipoplexes, LNPs, and polyplex micelles.
Overall, this platform offers a simple, scalable way to add tunable innate immune stimulation to mRNA vaccines using minimal additional RNA, and I would welcome the opportunity to discuss the potential applications and broader implications of these findings.

Speaker

Theofilus A. Tockary, Ph.D.

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12 : 20 PM - 12 : 50 PM

Participation URL (Zoom):
https://us04web.zoom.us/j/77753741109pwd=FziooKKBIw47DbZxI35xbqE6bTgi0r.1
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We look forward to your participation!

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Theofilus A. Tockary, Ph.D.

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