



Wolfson Department of Chemical Engineering Seminar

Thursday, August 22nd, 2024 at 10:30

Conference room, floor 3, Chemical Engineering Building

**“EPISOMES- Resected Tumor Biomimetic Nanoparticles for
Personalized and Prophylactic Immunotherapies.”**

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MSc Seminar

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One out of every eight women¹ worldwide is likely to develop breast cancer, making it the most prevalent cancer among women. Seven to eleven percent of women with early breast cancer experience a local recurrence within three years after treatment^{2,3}.

Since triple-negative breast cancer (TNBC) lacks targeted therapies, why not use the tumor itself to defeat it? Using the TNBC murine model, we engineered patient-specific EPISOMES (epitope-presenting liposomes) using the patient's resected tumor material that serves as specific-personalized treatment and preventative care for TNBC.⁴ Resected tumor material, affected by the patient's unique microenvironment, holds an enormous power to induce a specific immune response when surface-engineered into the nanovesicles.⁵

During this research, we have used murine TNBC resected tumor material to fabricate patient-specific EPISOMES using a microfluidic approach. Next, we characterized EPISOMES physiochemical and biomimetic features using DLS, SDS-gel, WB, TEM, and ELISA. Finally, we tested the ability of EPISOMES to induce an immune response, cause a reduction of tumor growth, and improve mice scoring and survival.

References

1. Siegel, R. L., Miller, K. D., Wagle, N. S., & Jemal, A. (2023). Cancer statistics, 2023. *CA: a cancer journal for clinicians*, 73(1), 17–48. <https://doi.org/10.3322/caac.21763>
2. Viale P. H. (2020). The American Cancer Society's Facts & Figures: 2020 Edition. *Journal of the advanced practitioner in oncology*, 11(2), 135–136. <https://doi.org/10.6004/jadpro.2020.11.2.1>
3. Waks AG, Winer EP. Breast Cancer Treatment: A Review. *JAMA*. 2019;321(3):288–300.
4. Zinger, Assaf. "Unleashing the potential of cell biomimetic nanoparticles: Strategies and challenges in their design and fabrication for therapeutic applications." *Journal of Controlled Release* 358 (2023): 591-600.
5. Zinger, A., Cvetkovic, C., Sushnitha, M., Naoi, T., Baudo, G., Anderson, M., Shetty, A., Basu, N., Covello, J., Tasciotti, E., Amit, M., Xie, T., Taraballi, F., & Krencik, R. (2021). Humanized Biomimetic Nanovesicles for Neuron Targeting. *Advanced science (Weinheim, Baden-Wurtemberg, Germany)*, 8(19), e2101437.

Refreshments will be served at 10:15.