הטכניון - מכון טכנולוגי לישראל

TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסה כימית
ע״ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Seminar

Monday, May 25th, 2026 at 13:30

Room 6

Volatolomic Analysis of Nanoparticles Interaction with Tumors

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MSc Seminar

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Monitoring how tumors behave and respond to treatment is still a major challenge, as current methods mostly rely on changes in tumor size rather than real-time biological activity. In this seminar, I present a new approach that aims to track tumor-related processes through the release of detectable chemical signals.

We developed a liposome-based nanosystem designed to respond to a tumor-associated enzyme called legumain. When these liposomes are taken up by cancer cells, the enzyme triggers the release of a small, volatile molecule (2-aminoisobutyric acid, 2-AiB). This molecule can then be detected in the surrounding environment using ion mobility spectrometry (IMS), providing an indirect but measurable signal of enzyme activity inside the cells. Initial experiments show that the release of this signal occurs only when the enzyme is active, confirming the specificity of the system. To better mimic real tumor conditions, we are extending this work from simple 2D cell experiments to more complex 3D tumor organoid models. In parallel, we developed a computational pipeline to analyze the IMS data, allowing us to extract and quantify chemical signals from complex measurements.

Overall, this work introduces a platform that combines nanotechnology, biology, and chemical sensing, with the long-term goal of enabling minimally invasive and real-time monitoring of tumor activity.

Refreshments will be served at 13:15.