



Wolfson Department of Chemical Engineering Seminar

Monday, May 26th, 2025 at 13:30

Room 5

**Detection of neuro-immune interactions in Alzheimer's disease via
Volatile organic compounds**

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MSc Seminar

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Alzheimer's disease (AD) is the most common cause of dementia, with around 55 million cases worldwide and 10 million new cases every year. AD is a neurodegenerative disease characterized by two pathological hallmarks: Amyloid-beta ($A\beta$) plaques and neurofibrillary tangles of hyperphosphorylated tau protein. In AD and other neurodegenerative diseases, the integrity of the blood-brain barrier (BBB) is compromised. BBB breakdown can lead to peripheral immune cells trafficking into the brain and increase the inflammatory state.

Recent studies indicate that volatile organic compounds (VOCs) can serve as indicators of cellular communication and can affect and control cell behavior without any physical contact with other cells, by sharing mutual headspace. Herein, we demonstrate the role of VOCs by analyzing non-contact cell communication between AD ReNcell™ VM (human neural progenitor cell line) infected with lentiviruses expressing AD mutations in human amyloid beta precursor protein (APP), Blood-Brain Barrier hCMEC/D3 cell line, and U937 monocytes. We used Gas Chromatography-Mass Spectrometry (GC-MS) and sensor array named Sniffphone to analyze and reveal distinct volatile signatures of the different cell types. This approach can provide novel avenues for learning about neuro-immune interactions and inspiring new ways to early detect and monitor Alzheimer's disease.

Refreshments will be served at 13:15.