Université de Montréal

MICROBIOLOGIE, INFECTIOLOGIE ET IMMUNOLOGIE



CONFERENCE

November 26th at 11.30AM
Room N-833
Université de Montréal, Pavillon Roger-Gaudry.
2900 boul. Édouard Montpetit (Chemin de la tour), Montréal.

Professor Georgina Cox

Associate Professor, Canada Research Chair, Department of Molecular and Cellular Biology, University of Guelph, Ontario, Canada

Systematic Dissection of the Escherichia coli Drug Efflux Network

Intrinsic resistance in Gram-negative bacteria arises from synergy between the low-permeability outer membrane and active drug efflux. Escherichia coli encodes 35 efflux pump genes whose overlapping substrate profiles confer phenotypic redundancy, precluding systematic genetic analysis. We generated EKO-352.0, an efflux-deficient strain background, together with an inducible complementation series enabling single- and multi-pump reconstitution: the E. coli Efflux Platform. Susceptibility profiling of structurally diverse compounds against this strain collection resolved pump-specific substrate assignments and identified AcrAB, AcrEF and MdtEF as the dominant polyspecific RND determinants. Random forest classification over 300 molecular descriptors demonstrated that bulk physicochemical parameters are insufficient to discriminate susceptible from avoidant chemotypes, whereas a shared lipophilicity–charge signature predicts efflux across all three pumps. By deconvoluting a redundant network into its individual contributions, this platform provides both a genetic toolkit and a predictive framework for designing antibacterials that evade efflux.