



uOttawa

University of Ottawa – Project UO2

Title: Molecular mechanism of the cardio-metabolic ABC cholesterol transporter

Supervisor: Jyh-Yeuan Lee

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Field: biochemistry and molecular biology; microbiology; molecular medicine

Duration: 6-8 weeks

Project context:

Elevated plasma level of cholesterol is a risk factor to developing atherosclerosis, a leading cause to cardiovascular diseases, such as heart attack and stroke. To maintain cholesterol balance, an equivalent amount of cholesterol must be eliminated from cells and tissues, and excess cholesterol in cells is transported to extracellular acceptors in the circulation by transporter-mediated cholesterol reverse transport. The ATP-binding cassette (ABC) lipid transporters control cholesterol and phospholipid crossing on cellular membranes, and their deficiency causes atherosclerosis, hypertriglyceridemia, and impaired high-density lipoprotein. Our laboratory uses membrane protein structural biology to study the function-structure relationship of the ABC lipid transporters. This summer internship project will focus specifically on the subfamily-G ABC cholesterol transporters, and during the internship, the student will learn to address how mutations impact the catalytic function and cholesterol transport by ABC transporters. The student will learn to purify recombinant membrane proteins from yeast cells, measure their catalytic activities, and perform lipid-driven crystallization of both wild-type and mutant proteins. At the end of the Internship, the student is expected to be able to design and perform experiments to study the mechanism of ABC transporters by biochemical and structural biology approaches.

Requirements:

- 1) Basics: freshman-level Biology, General Chemistry, General Physics, and Calculus.
- 2) Preferred, but not essential: Organic Chemistry, Biochemistry, and Molecular Biology.

Additional information:

Students from *middle-class* or *low-income* family background are strongly encouraged to apply.