**Molecular and cellular function of vitamin K in health and diseases**

**Research project:** Our laboratory is studying the role of vitamin K and vitamin K-dependent proteins in normal physiology and in diseases, including diabetes, osteoporosis and cancer. Several projects are currently available for a postdoctoral fellow or a research assistant.

**Project 1. Vitamin K and bone mass.** This project will focus on understanding how bone mass is regulated by vitamin K, the co-factor of gamma-glutamyl carboxylase, an enzyme modifying specific secreted proteins. Funded by CIHR.

**Project 2. Vitamin K, beta cell function and diabetes.** We are interested in understanding how vitamin K is implicated in the biology of beta cell and how partial vitamin K deficiency contributes to the development of diabetes. This project should lead to the characterization of novel molecular mechanisms mediating the biological function of vitamin K-dependent protein carboxylation and will also assess its relevance to β-cell function in humans. Funded by CIHR.

**Project 3. Vitamin K and liver cancer.** Previous studies suggested that vitamin K deficiency might be implicated in the development of hepatocellular carcinoma (HCC or liver cancer). The current project focus on one enzyme which is implicated in the recycling of vitamin K in the liver. Our preliminary results support an important role for this enzyme in preventing HCC in mouse models. Funded by the Cancer Research Society.

Interested candidate should contact Mathieu Ferron: mathieu.ferron@ircm.qc.ca

**The lab:** Established in 2013, the Ferron lab is currently composed of 1 research associate and 3 PhD students. The team will expend in the upcoming year since we recently obtained additional funding. This is a great opportunity to join a very dynamic team (30 publications in past 8 years)!

Suggested recent publications from our group (members of the team are underlined):

Al Rifai, O., Julien, C., Lacombe, J., Faubert, D., Lira-Navarrete, E., Narimatsu, Y., J., L., Clausen, H., **Ferron, M.\***. The half-life of the bone-derived hormone osteocalcin is regulated through *O*-glycosylation in mice, but not in humans. *eLife.* 2020. 9:e61174.

Lacombe J., Al Rifai, O., Loter, L., Moran, T., Turcotte, A.F., Grenier-Larouche, T., Tchernof, A., Biertho, L., Carpentier, A.C., Prud’homme, D., Rabasa-Lhoret, R., Karsenty, G., Gagnon, C., Jiang, W., **Ferron,M.\*** Measurement of bioactive osteocalcin in humans using a novel immunoassay reveals association with glucose metabolism and beta-cell function. *Am J Physiol Endocrinol Metab*. 2020, **318**, E381-E391.

Lacombe, J., Rishavy, M.A., Berkner, K.L., **Ferron, M\*.** VKOR paralog VKORC1L1 supports vitamin K-dependent protein carboxylation in vivo. *JCI Insight.* 2018, **3**(1): e96501.

Al Rifai, O., Chow, J., Lacombe, J., Julien, C., Faubert, D., Susan-Resiga, D., Essalmani, R., Creemers, J.W., Seidah, N.G., **Ferron, M\*.** Proprotein convertase furin regulates osteocalcin and bone endocrine function. *The Journal of Clinical Investigation*. 2017, **127**(11), 4104-4117.