

# Experimental characterization and mathematical modeling of lipolysis and its regulation

---

## Summary

---

Rudolf Zechner, Institute of Molecular Biosciences, University of Graz, Austria

Supervisor: Prof. Dr. Rudolf Zechner  
Availability: This position is available.  
Offered by: Medical University of Graz  
Application deadline: Applications are accepted between July 15, 2019 00:00 and September 15, 2019 23:59 (Europe/Zurich)

## Description

---

### Research interests and scientific background:

Lipolysis of lipid droplet-associated (LD) triacylglycerols (TGs) in the cytoplasm of adipocytes and other cell types is a central biochemical pathway that provides fatty acids (FAs) and glycerol as essential energy substrates and anabolic intermediates. The process requires elaborate regulation because uncontrolled lipolysis can lead to FA-induced "lipotoxicity", insulin resistance, and fatty liver disease. A detailed understanding of the lipolytic process is a prerequisite to elucidate its role in pathogenesis and to develop counteracting drugs. TG degradation involves three consecutive hydrolytic reactions catalyzed by at least three cytosolic enzymes (adipose TG lipase (ATGL), hormone-sensitive lipase (HSL), monoglyceride lipase (MGL)) and, possibly, a lysosomal acid lipase (LAL) (lipophagy).

### Affiliation:

This project is part of the SFB Lipid Hydrolysis. The experimental work will be done at the Institute of Molecular Biosciences (IMB) at the University of Graz.

### Hypothesis and objective:

The combination of experimental enzymology and mathematical modeling will lead to a quantitative, systemic understanding of the hierarchy of lipases and enzymatic reactions that govern triglyceride catabolism (lipolysis) and metabolic homeostasis.

### Methodology:

Enzyme assays; enzyme kinetics; protein purification; flux studies with non-radioactive isotopes in cells and organisms; cell and tissue culture; lipid analysis.

### References:

Zechner R. et al. Cytosolic lipolysis and lipophagy: two sides of the same coin. *Nat Rev Mol Cell Biol.* 2017 18:671-84



To get more information or to apply online, visit <https://mug.glowbase.com/positions/159> or scan the the code on the left with your smartphone.