

**Nampt-mediated NAD synthesis plays crucial role
in differentiation and metabolic remodeling of
3T3-L1 preadipocytes**

Keisuke Okabe

**First Department of Internal Medicine, Graduate School of Medicine and
Pharmaceutical Science for Education, University of Toyama**

Summary

Nicotinamide adenine dinucleotide (NAD) is an essential coenzyme involved in various metabolic reactions. Nampt, a rate-limiting enzyme in the NAD biosynthesis pathway, is known as an adipokine itself. However, the role of NAD and Nampt in adipocyte differentiation still remains unknown. In this study, we employed liquid chromatography-mass spectrometry (LC/MS) and gas chromatography-mass spectrometry (GC/MS) - based targeted metabolomics to elucidate the metabolic remodeling during differentiation of 3T3-L1 preadipocytes. We clarified metabolic remodeling in glycolysis, pentose phosphate pathway, TCA cycle, and NAD biosynthesis pathway. We also revealed that up-regulated NAD synthesis in salvage pathway was necessary for the differentiation of 3T3-L1 preadipocytes. During differentiation, increased NAD influenced the gene expression for adipogenesis through poly(ADP-ribosyl)ation. Simultaneously, NAD seems to be required to drive other metabolic changes to support the differentiation. Altogether, we concluded Nampt-mediated NAD synthesis plays crucial roles in differentiation and metabolic remodeling of 3T3-L1 cells.