**Abstract**

**Role of trained immunity in obesity-associated diseases**

Kae Won Cho

Soonchunhyang Institute of Medi-Bio Science (SIMS), Soonchunhyang University, Cheonan 31151, Korea

Obesity is low-grade chronic inflammation state with higher inflammatory immune cell in adipose tissue and associated with the onset of metabolic disorders including type 2 diabetes and cardiovascular diseases. Weight loss intervention ameliorates some of these effects, but the subsequent weight regain are common, which is referred to as “weight cycling” or “yo-yo dieting”. Furthermore, human and rodent data demonstrated that the weight cycling aggravates the inflammation and worsens metabolic health. However, the underlying mechanisms of weight cycling induced metabolic disease are poorly understood. Recent studies suggest that immunological memory in innate immune cells appears to be crucial to provoke pro-inflammatory responses. These findings led us to investigate the role of immunologic memory in the weight cycling-induced metabolic diseases. Using diet-switch model, we show that weight cycling creates an obesogenic memory in adipose tissue macrophages and the obesogenic memory in innate macrophages are critical factor to regulate tissue inflammation and insulin resistance. The molecular mechanisms to drive obesogenic memory in adipose tissue immune cells and potential therapeutic strategy to treat weight-cycling induced inflammation will be discussed in this presentation.