

---

# Differential role of dietary fibers and calorie restriction on sirtuin protein

Shubhra Pande\*<sup>1</sup>, Elena Esimbekova<sup>1,2</sup>, and Valentina Kratasyuk<sup>1,2</sup>

<sup>1</sup>Laboratory of Bioluminescent Biotechnologies, Department of Biophysics, Institute of Fundamental Biology and Biotechnology, Siberian Federal University, 79 Svobodny prospect, Krasnoyarsk, 660041, Russia – Russia

<sup>2</sup>Institute of Biophysics SB RAS, Akademgorodok 50/50, Krasnoyarsk, 660036, Russia – Russia

## Abstract

Sirtuin are NAD<sup>+</sup> dependent protein which has emerged out as a potential biomarker for ageing. These proteins were reported to perform ADP-ribosyltransferases activity and protein deacetylation. Recently, there have been a plethora of research investigations which have indicated strong links between calorie restriction and sirtuin levels. The amount of nutrient availability is sensed by these proteins (seven mammalian sirtuins have been reported so far) and regulate metabolic processes such as glycolysis, gluconeogenesis and insulin sensitivity. Sirtuins deacetylate the nuclear receptor, causing their inhibition that activates adipogenesis fat synthesis in the body, enabling favorable cellular and health changes. Sirtuins also mediate positive intracellular response that promotes DNA damage repair and cell survival, thereby enhancing the longevity of cells. Sirtuin activity also brings a wide spectrum of other health benefits and its activity levels are indicative of nutritional status as well. Their levels have also been affected during disease progression in cancer, inflammation, obesity, cardiovascular diseases, and viral infections. However, there is a poor relationship between nutrient intake and existing nutritional biomarkers. In this regard, we are investigating the role of dietary fibers in regulating the sirtuin levels since dietary fibers simulate the conditions of calorie restriction. The study will be conducted through animal experiments using male wistar rats that will be grouped into three having eight candidates in each and their dietary pattern will be designed accordingly. Their sirtuin levels will be analysed using analytical methods preferably bioluminescence based.

**Keywords:** Sirtuins, NAD<sup>+</sup>, biomarker, dietary fibers, calorie restriction, bioluminescence

---

\*Speaker