**Sleep Loss Can Cause Death through Accumulation of Reactive Oxygen Species in the Gut**

Vaccaro A, Kaplan Dor Y, Nambara K, et al. Sleep Loss Can Cause Death through Accumulation of Reactive Oxygen Species in the Gut. Cell. 2020 Jun;181(6):1307-1328.e15.

**Presenter**： Ke-Ji Lin **Date/Time**：2020/09/24 15:10-16:00

**Commentator**：Hsueh Cheng Chiang Ph.D. **Location**：Room 601, Med College Building

**Background**

Sleep is an important behavior to most animals, it make animal rest, repair body damage, clean body waste, and restore body function. Sleep loss will cause cognitive decline, accumulation of body waste, dysfunction of the gastrointestinal, immunity, metabolism and circulatory system, and leads to premature death. Reactive oxygen species (ROS) are an unstable molecule which as a byproduct of the metabolism of oxygen, because of ROS have unpaired electrons, it will interact with other molecules such as DNA, proteins and lipids, cause oxidative stress and cellular damages. Multiple studies have reported that, long-term sleep restriction cause antioxidant response change and damage organ, but the origin location of oxidant molecules, and whether it is a cause or consequence of damage, and the correlation with death of sleep-deprived animals are still not clear.

**Objective/hypothesis**

To investigate how the sleep deprivation affect animal health, and the relationship between sleep deprivation and death.

**Result**

The authors used drosophila and mice as animal model, with thermogenetic stimulation combined Gal4/UAS system, mechanical stimulation and RNAi or loss-of-function mutation, to processed sleep deprivation, they found that the lifespan of severe sleep deprivation animals have significantly decreased. In addition, they found high levels ROS accumulated at the gut of both drosophila and mice, and caused severe cellular damage. To prove the impact of sleep deprivation to premature death, they used antioxidant drugs and overexpression antioxidant enzyme at gut, demonstrated that even under sleep deprivation, also can rescuing their lifespan through clearance of gut ROS without increase sleep time.

**Conclusion**

Sleep deprivation will cause ROS accumulation in animal gut and lead to serious cellular damage, may correlate with premature death, but through clearance of gut ROS could rescued their lifespan.

**References**

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