

# FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** Molecular analysis of the circadian clock and technical development of chronomedical methodology for improvement of temporal environment in round-the-clock society

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## 1. Background of research

The circadian clock (an internal clock with an approx. 24-hr period) generates rhythms in various physiological functions such as sleep, blood pressure, body temperature and metabolisms. Although the synchronization between body and lifestyle rhythms is indispensable for maintaining our health, in the modern society, the chronic time lag between both causes serious health risks related to sleep disorder, mental dysfunction, cardiovascular diseases and diabetes.

## 2. Research objectives

The aim is to elucidate unsolved issues on the current molecular model of the circadian clock, and to analyze the molecular interaction between the clock and arteriosclerosis, which is one of the major causes of death in Japan. Furthermore, our project includes another two experiments. One is the improvement of our method for assessing the human clock up to the clinical setting, and the other is a screening of substances useful for adjusting internal clock phases.

## 3. Research characteristics (incl. originality and creativity)

The correlation between the circadian clock and disorders has been elucidated by the epidemiologic achievement on rotating shift workers and the recent biological data obtained using clock-deficient animals. Although new diagnostic and treatment strategies targeting the circadian clock are required to realize healthy lifestyle, this concept is poorly introduced into the clinical setting. Our project could play a pioneer role in it.

## 4. Anticipated effects and future applications of research

Our research will contribute for realizing healthy lifestyle by restoring the internal clock function. Our method for assessing the clock could be utilized for a diagnosis and treatment for diseases such as sleep and mental disorders, an investigation for improving the labor environment of nighttime workers, and a drug administration based on the body time. Furthermore, substances effective on the circadian clock could be useful for adjusting it in the form of functional food ingredients, which could be also helpful when recovering from jet lag.