Form 3

Report for Joint/Usage Research Program for Endocrine/Metabolism (Fiscal Year 2019)

Date: 2020/03/29

To Director of Institute for Molecular and Cellular Regulation, Gunma University

Principal Applicant	
Institution	Nagoya University
Position	Designated Professor
Name	YOUNGJAI YOU

We report on the results of joint research in fiscal 2019 as below.

(Program No. 19007)

1. Research Title	The role of nuclear receptors in epigenetic regulation of feeding
2. Purpose and Significance of the research project	Based on our discovery that certain nuclear receptors (NRs) control feeding and fat storage in *C. elegans*, this study aims to investigate the genetic and epigenetic mechanisms underlying it. The roles of NRs and their involvement in epigenetic regulation of feeding are largely unknown. This study will reveal new mechanisms by which NRs contribute to misregulation of feeding and resulting obesity. In addition, because the NRs we found are mostly expressed in the neurons or in the intestine, this study will also provide the novel link between two organs mediated by transcriptional and epigenetic regulations.
3. Period of The Program	April 1, 2019 ～ March 31, 2020

4. Project Members

Name	Age	Gender	Institution/Department	Position	Role
(Principal Applicant) YOUNGJAI YOU	54	F	Nagoya University/ Graduate School of Science/ Division of Biological Science	Designated Professor	Project director
(Research Collaborators)					

※If additional space is required, attach a separate sheet.

5. Collaborative Researcher of IMCR	Name of the Laboratory	Epigenetics and metabolism	Name	Takeshi Inagaki

Institute for Molecular and Cellular Regulation Gunma University IMCR

6 . Research Plans

We will investigate how NRs regulate food intake and fat storage via epigenetic regulation, in collaboration with the Dr. Inagaki group.

- To determine where the NRs increase the expression upon starvation using transgenic lines. This is to understand their function at the tissue level.
- To examine whether starvation alters histone marks such as H3K4me3, using various means of immunohistochemistry. This is to examine whether metabolic challenge alters global epigenetic modifications at an organism level.

7 . Research results:

- We have examined the expression of NHR-50, a *C. elegans* homolog of HNF-4 of mammals. It is expressed throughout the nervous system and pharynx, the feeding organ. Upon starvation, we observed slight increase in expression on the pharynx and the neurons, suggesting these organs would be where NHR-50 acts to regulate starvation response.
- We examined H3K4me3, a histone marks associated to activated states of chromatin, during long term starvation. After 5 days of starvation the H3K4me3 marks increased, suggesting certain genes are activated by starvation

Based on these results, we will try to understand how the NRs play roles in starvation response, linking its role in epigenetic regulation.

8 . Publications and/or Presentations resulting from Joint Research Program with IMCR.

①Please describe a list of publications in which the name of the collaborative researcher of IMCR appears and send one paper reprints of each publication to IMCR.

N/A

②Please describe a list of publications which include the description that the research is supported by Joint Research Program with IMCR and send one copy of each publication to IMCR.

N/A