Form 3

Report for Joint/Usage Research Program for Endocrine/Metabolism (Fiscal Year 2018)

Date: 2019/04/16

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

Principal Applicant	
Institution	Kyushu University
Position	Associate Professor
Name	Ka Fai William TSE

We report on the results of joint research in fiscal 2018 as below.

(Program No. 18003)

1. Research Title	Triclosan: a risk factor of fatty liver disease
2. Purpose and Significance of the research project	The project aims to understand the developmental toxicity of a common environmental pollutant, triclosan (TCS), on its stimulatory effects on developing the fatty liver disease. TCS and its degradation by-product, 2,4-Dichlorophenol (2,4-DP), can be found in the environment worldwide. Their potential toxicities on the lipid metabolism and liver development are not well known. We hypothesize that the exposure of TCS and 2,4-DP will promote the development of fatty liver. The transgenic zebrafish model will be used to perform functional assays; together with the next generation sequencing, the potential link between the TCS and fatty liver will be uncovered.
3. Period of The Program	April 1, 2018 ～ March 31, 2019

4. Project Members

Name	Age	Gender	Institution/Department	Position	Role
(Principal Applicant) Ka Fai William TSE	36	M	Kyushu University, Faculty of Agriculture	Associate Professor	Project director
(Research Collaborators) Yun-jin JIANG	55	M	National Health Research Institutes, Institute of Molecular and Genomic Medicine	Associate Investigator	Expert in zebrafish genetics / Advisor
Keng Po LAI	43	M	City University of Hong Kong, Department of Chemistry	Visiting Assistant Professor	Expert in RNA-sequencing and bioinformatics/ Advisor
May-su YOU	56	F	National Health Research Institutes, Institute of Molecular and Genomic Medicine	Senior Specialist	Expert in zebrafish genetics / Advisor

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

5. Collaborative Researcher of IMCR	Name of the Laboratory	Integrated Signaling Systems	Name	Tohru ISHITANI

6. Research Plans

This is a 2 years project. The first year (2018-2019) aims to identify the hepatotoxicity of TCS and its degradation by-product 2,4-DP in the wild-type and liver- GFP labeled zebrafish. General characterization of metabolic genes and enzymes of the fatty liver disease *trappc11*$^{-/-}$ embryonic model under the acute TCS or/and 2,4-DP exposure will be performed. Furthermore, the developmental functional time window of the *trappc11* gene will be identified by injecting the Photo- morpholino to turn on or off the gene at specific time point. All these studies will give us the background information on how the TCS and 2,4-DP could interact with *trappc11* and influence the lipid metabolism during early embryogenesis. International team members will visit Gunma University in the summer time to discuss the project with the young students/ postdoctoral researchers in the Prof. Ishitani's laboratory. By the end of the first year, we will be ready to dissect the genetic information of the TCS/ 2,4-DP exposed embryos via RNA-sequencing. Differentiate expressed genes among the control, mutant, control exposed to toxicants, and mutant exposed to toxicants will be identified. The sequencing and the relatively bioinformatics analysis are expected to be done in the second year (2019-2020). Further functional experiments will be performed to understand the detailed mechanism.

7. Research results:

In the previous year (2018-2019), we have obtained the mutant line, and confirmed the experimental dosage. Furthermore, general characterization of metabolic genes and enzymes of the fatty liver disease *trappc11*$^{-/-}$ embryonic model and cell culture model under the acute TCS and 2,4-DP exposure have been done. We are now identifying the development functional time window of the *trappc11* gene to investigate its relationship with the pollutants. Results suggested that the TCS and 2,4-DP could influence the lipid metabolism during early embryogenesis. After a year of the work, we obtained the background data and we are going to perform the next generation sequencing in this year (2019-2020). The sequencing will dissect the genetic information of the TCS/ 2,4-DP exposed embryos.

Regarding the international collaborations, Two PIs from Taiwan and I visited the institute to give a seminar and discussed the necessary issue in the project. The visiting further strengthens our relationships, and enhances the idea exchange among the students, postdoctoral fellows and PIs.

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