

平成 30 年 3 月

国立研究開発法人理化学研究所
理事 松本洋一郎 様

基幹研究推進室（事務局）

平成 29 年度実施 主任研究員の研究業績レビュー（中間）の結果について

研究開発等評価実施規程（平成 15 年 10 月 1 日規程第 74 号）及び主任研究員及び上席研究員研究業績評価実施細則（平成 27 年 10 月 23 日細則第 84 号）に基づき主任研究員の研究レビュー（中間）を実施し、レビューアーから事務局に送られた評価結果を下記のとおり報告いたします。なお、評価委員の総意のもと、意見を取りまとめた報告書として提出いただいたこと、申し添えます。

1. 評価対象：田中生体機能合成化学研究室 田中 克典主任研究員

1) 評価体制

実施日：平成 30 年 2 月 9 日（金曜日）

4 名の所外有識者を評価委員とするヒアリングレビューを実施。

評価者：

Tamao ENDO, Vice director

Tokyo Metropolitan Geriatric Hospital and Institute of Gerontology, Japan

David W. GRAINGER, Professor

University of Utah, U.S.A

Yoshiki KATAYAMA, Professor

Kyushu University, Japan

Kazuya KIKUCHI, Professor

Osaka University, Japan

2) 評価結果の概要等

General collective comments:

Research objectives: The Biofunctional Synthetic Chemistry Laboratory is directed by Chief Research Scientist, Dr. Katsunori Tanaka. The lab's primary objectives are to synthetically explore the unique activity of conjugated imines for biosynthetic applications, both as natural products and as produced within living organisms, including mammals. Dr. Tanaka's "Therapeutic In Vivo Synthetic Chemistry" seeks to enable new organic transformations within organs and tissues for local pharmacological effects. He uses glycan ligands to try to target organs with metal catalysts to perform this selective chemistry in vivo. The objectives are ambitious, challenging and creative. As an expert in imine synthesis, Dr. Tanaka is qualified for this synthetic pursuit. The biomedical ambitions require collaborations.

Research results: Dr. Tanaka's production over the past 5 years is reasonable with over 70 peer reviewed publications in synthetic journals. Much of this work is of interest, however not cited highly so far. The more substantial impact will be found in the in vivo validation of his approach: the new imaging, tissue-based synthetic selection, specific

ligand targeting of tissues, and proof of controlled in vivo biosynthesis. This is all still in very early proof of concept stage without much scientific evidence. Hence, Dr. Tanaka is in a “transition zone” where he must now carefully show in vivo mechanism and strong proof of concept to gain the attention of the biomedical research community that must validate the impact of his synthetic claims. Then his creative ideas will be accepted.

Management of the Laboratory: Dr. Tanaka has steadily grown his group to over 20 members. Members respect Dr. Tanaka’s management style, expertise and hands-on approach. He is directly involved in daily lab direction. He has created a productive and positive work environment for young members.

Future research plans: To achieve his in vivo aims, Dr. Tanaka requires sophisticated biochemical and biomedical in vivo expertise for targeting, imaging, biodistribution, histology and bioanalytical chemistry of his imine products. He does not possess this biomedical expertise. He has outside collaborations but is now seeking to produce this capability in-house. Obtaining this essential guidance and expertise is a very critical decision for realizing his concept. He must demonstrate and exploit better biomedical research competence in future work for impact and recognition.

Overall assessment: The lab has good direction and creative synthetic vision. Morale and organic synthetic capabilities are excellent. The lab vision will be realized in successfully proving bioselective imine synthesis in vivo using targeted reagents. This is extremely challenging and will require much more focus on mechanism and validation with careful, sensitive biomedical research techniques that are not yet visible in this lab’s competence. Strategic new decisions must produce this competence.

Other opinions: The idea to create his original chemical tools are excellent, thus it is worthwhile to strengthen selectivity and efficacy under cellular and in vivo conditions. Careful analytical verification of each chemical modification should provide improved evidence and information for improving the above points, for instance, albumin modification can be investigated in more detail as can in vivo chemical products and yields. The lab needs to focus on mechanistic studies and better proof for in vivo synthetic chemistry.

以上