

Graduate School Special Lecture 大学院特別講義

(医歯学先端研究特論)

(生命理工医療科学先端研究特論) (医歯理工学先端研究特論)

Zoomによるオンライン講義

受講希望者は前日7月26日(水)17時までに、下記の連絡先まで問い合わせて下さい。なお、本学の学生について出席確認のため本講義を受ける際は本学の機関登録をしたZoom IDとパスワードでログインするようお願いいたします。

If you wish to attend the lecture, please contact the following address by 5:00 p.m. on Wednesday, July 26, the day before the lecture. For TMDU students, please log in to this lecture with your Zoom ID and password registered at TMDU to confirm your attendance.

1. Speaker: **Professor Jin Geng**

Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences

2. Title: **Polymerisation inside living systems**

3. Time: **Thursday, July 27, 2023; 17:00 – 19:00**

4. Abstract: As is well known, due to the highly complex chemical environment inside cells and the extreme sensitivity of cells to external stimuli, it has been challenging to achieve molecular structure transformation, especially polymer synthesis, in living cells using chemical methods. Because of limitations in relevant technologies, exploration of these issues is currently in its early stages. One can imagine, however, if artificial polymers were introduced into cells, would they interact with natural polymers, affect cell behaviour, change the original cell function, and kill tumour cells to achieve tumour therapy? Could they regulate the tumor microenvironment and achieve directed induction of stem cell differentiation?

For in situ synthesis of polymer in cells, we have developed several new strategies, such as using a variety of biocompatible acrylic acid and methyl acrylic acid monomers to synthesise non-natural polymers directly in mammalian cells through free radical polymerisation. It is worth noting that free radical polymerisation chemistry can occur in such a complex cell environment, providing many new possibilities for chemists to regulate cell function and behaviour. We have demonstrated how intracellular polymers can affect cell function—for example, cell skeleton structure and cell motility can be altered by polymerisation in living cells. Using photo-induced polymerisation to generate new non-natural polymers in living cells paves the way for cellular engineering, and functional polymers formed in situ may be explored in fluorescence imaging, cell tracking, control of cell skeleton function, and cell motility. The potential strength and applicability of this

method make it a truly outstanding discovery, with significant value for current research in polymer science, cell biology, and biomedical disciplines.

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