

Shigeru Kondo

OSAKA UNIVERSITY

e-mail: shigerukondo@gmail.com

How experiment and mathematics can cooperate in the study of Turing patterns of real biological systems?

It was 60 years ago that Turing presented his outstanding idea about the biological pattern formation. Since then, many theoretical studies have been suggesting the RD mechanism could be one of the principles of biological morphogenesis. Such theoretical studies seem to be enough for the mathematicians to believe the biological relevance of the theory. However, majority of the developmental biologists still feel that the idea of RD is not so much related to their study in spite of the several empirical evidences.

We guess this problem comes from the gap of complexity between the simple differential equations and the complex real biological phenomena. Through the 15 years of experiment on the pigmentation stripe of fish skin, we recently found that many kinds of cellular events, migration, differentiation, dendrite elongation, and gap junctions, are involved in the pigment pattern formation. The whole system is not similar to any of simple model proposed before. After presenting our newest data, I would like to discuss the possible way for the cooperation between the theoretical and experimental sides.