

Making drugs based on the wisdom of the microorganisms.

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In Astellas Pharma, many scientists have been struggling to make innovative drugs from fermentation natural products, the great gifts of the microorganisms, for 40 years. As a result, we have launched two drugs, FK506, an immunosuppressant and FK463, an anti-fungal antibiotic. On the way of these drug discoveries, technology and philosophy of fermentation drug discovery have achieved a meaningful revolution though it could not be recognized in general. This revolution means “From serendipity to invention”.

FK506 was found by accident (serendipity) by random screening of fermentation broths prepared with conventional methods though existing of cyclosporin A, a fungal metabolite, strongly indicated that microorganisms would produce more superior compound than it. On the other hand, FK463 was created by a good harmonious collaboration between human and microorganisms. Human gave microorganisms the suitable condition to exert their potential and microorganisms gave human an unbelievable compound he can not meet by his own efforts. This collaboration induced fusion of the wisdoms of human and microorganisms to be a great invention. Then, this heterogeneous invention has been completed by medicinal chemists to realize it as a drug.

Fermentation natural products also let human know unknown biological targets useful for drug making. To use the wisdoms of microorganisms, we must develop technologies of chemical biology such as a target hunting. Identifying the targets of natural products leads to not only understanding of new biology but also expanding the possibility of natural product drug discovery by promoting medicinal chemists. In the post-genome era, collaboration of medicinal microbiologists with medicinal chemists will be very important for the drug discovery in Japan.