

# AI for Biotechnologies: A New Approach Using Large Language Models and Knowledge Graphs



Speaker: Prof. Dr. Prof. h.c. Andreas Dengel  
Affiliation: German Research Center for AI (DFKI)

Time & Location (The same talk in two places) :

- ① May 19, 2025 (Mon) 13:15–14:45 Smart Energy Building  
Nakamozu Campus,  
Osaka Metropolitan Univ.  
② May 20, 2025 (Tue) 10:45–12:15 Abeno Medix, 6F

Language : English

**Summary :** Biotechnology and drug research are facing increasingly complex challenges: diseases are increasingly being viewed in an individualized way, the development of new active ingredients is costly and lengthy, and at the same time, there is a growing need for sustainable solutions in medicine, agriculture and nutrition. But how can new insights be gained faster and more efficiently in this complex environment?

One promising approach is the use of artificial intelligence – in particular, large language models and knowledge graphs. These technologies enable a better understanding of biological relationships and the discovery of hidden patterns in large amounts of data. The lecture presents a globally unique, curated data set that combines sequence data with semantic information about biological entities. This makes it possible to use AI-supported methods specifically for the analysis of biological processes – without the need for complex experiments in the wet lab.

Based on this innovative database, the lecture introduces innovative AI tools and frameworks showing how interactions of biological entities can be predicted more precisely, how biomarkers can be identified automatically, and how new pathways can be discovered. These insights open up new possibilities for drug development, drug repurposing and repositioning of existing active ingredients – and thus help to drive biotechnological innovation faster, more cost-effectively and more sustainably.

## 🏆 About the speaker

<https://www.dfki.uni-kl.de/~dengel/indexEng.php>

- Representative, DFKI Kaiserslautern
- More than 100 researchers work at his lab for various topics of AI
- Head of Japanese "Flexible Factory Partner Alliance"

<https://www.ffp-a.org/about/jp-message.html>

- 2018: Special Distinguished Professor at OPU
- 2021: The order of Rising Sun From Japanese Government

Sponsor : DFKI Lab Japan

Cooperation : Grad. Sch. of Informatics, OMU  
Institute of Drug Discovery Sciences

## 🔗 Relevabt Projects

JST ASPIRE

MxAI: Formation of a Japan-Germany Multilayered R&D Network for Medical X AI and Its Application to Industry Creation

PI : Koichi Kise (OMU)

<https://www.aspire-mxai.com/>

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