

## **MISSION - Streamlined *Streptomyces* cell factories for industrial production of valuable natural products**

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Natural products cover a unique chemical space, which is particularly well-suited for the development of antibiotics and anticancer drugs. Actinomycetes are the richest source of natural products such as antibiotics for medical, veterinary and agricultural use, and therefore represent a class of bacteria of considerable interest for the human welfare. Indeed, there is huge number of novel compounds discovered so far, however, the supply of sufficient amounts for studying of pharmacological properties is a significant bottleneck in drug development. MISSION will create a smart natural products supply platform, based on the powerful industrial oxytetracycline overproducer *Streptomyces rimosus*. Our concept integrates systems and synthetic biology with bioinformatics and process engineering into a purpose-driven and engineering workflow. Multi-omics analysis will deliver key insights for targeted strain optimization along the development pipeline. The iterative and interactive combination of carefully tailored experimental and computer-based modelling approaches will support the prediction of multi-combinatorial genetic traits to develop a superior microbial chassis. A full range of new synthetic parts, such as fine-tuned promoters, terminators and regulatory circuits as well as cutting-edge CRISPR/Cas9 genetic engineering will be developed for an exact, marker-less and fast translation of identified, desired features into a clear genetic language, operated by the created *S. rimosus* cells. In addition to biosynthetic power, MISSION will consider cellular genetic stability, process tolerance and robustness by pre-early integration of expected needs from industrial partners into the design process. This will enable a tailor-optimized production of valuable bioactive compounds for downstream development as pharmaceuticals.