

## **Biocatalysis in Chemical R&D at Novartis – leveraging its full potential throughout all development stages**

Florian Kleinbeck

Novartis Pharma AG, 4056 Basel, Switzerland

*florian.kleinbeck@novartis.com*

Nature – with its vast array of enzymatically catalyzed transformations at hand – has always been a deep inspiration for chemists. While the use of enzymes to carry out chemical transformations was originally limited to naturally occurring or structurally related substrates, directed evolution has opened up new avenues to convert non-natural substrates to high-value products or even tune the reactivity of enzymes to catalyze new reactions. With its mild, environmentally benign and safe reaction conditions, typically resulting in excellent yields and high product quality, biocatalysis is particularly attractive for use in the pharmaceutical industry. The strategic and operational potential of biocatalysis is outlined by various examples from the recent Novartis product portfolio, ranging from lab scale to commercial production.