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Unravelling new biological functions of lytic polysaccharide monooxygenases

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PURPOSE OF THE ABSTRACT
Lytic polysaccharide monooxygenases (LPMOs) are copper-dependent redox enzymes originally identified in saprobiontic fungi and bacteria [1]. The main function of LPMOs is to degrade biopolymers such as cellulose, starch or chitin through an oxidative process that is not yet fully understood [2]. Recent proteomic and biochemical studies have shown that LPMOs fulfil a multiplicity of biological functions beyond biomass degradation. In fact, recent landmark papers have linked LPMO activity to insect resistance in ferns [3] and to the survival of pathogens in human blood [4].

In our ongoing work, a panel of selected LPMOs from pathogenic bacteria is recombinantly produced and biochemically characterised. Importantly, LPMO activity strictly depends on the supply of external reductants and hydrogen peroxide or oxygen. Therefore, we will investigate a range of proteinogenic and other redox-active compounds as possible sources of electrons and hydrogen peroxide for the enzyme in vivo. Using Vibrio cholerae as a model organism, the pathogenetic relevance of its LPMOs will be investigated through serum assays and mouse infection models. Ultimately, the project aims to clarify whether LPMOs found in pathogenic bacteria contribute to infectious processes or if they primarily support the survival of the bacteria outside the host organism.

FIGURES

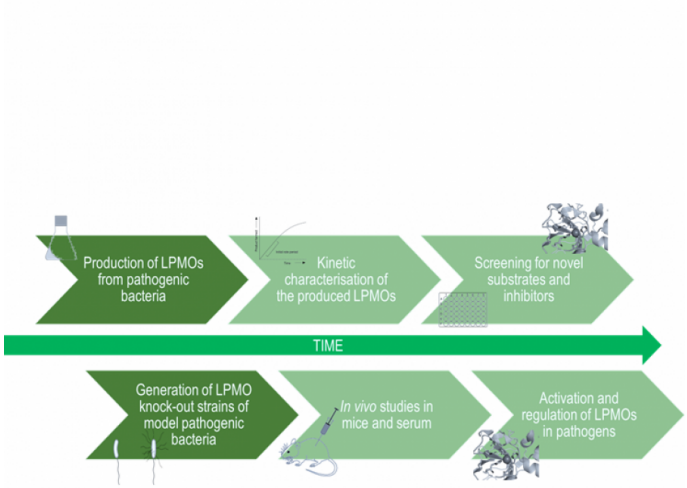

FIGURE 1

Workflow. Discovery of LPMOs from pathogenic bacteria.

The picture depicts the workflow of the ongoing project.

FIGURE 2

KEYWORDS

lytic polysaccharide monooxygenases | enzyme discovery | pathogenicity | biocatalysis

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