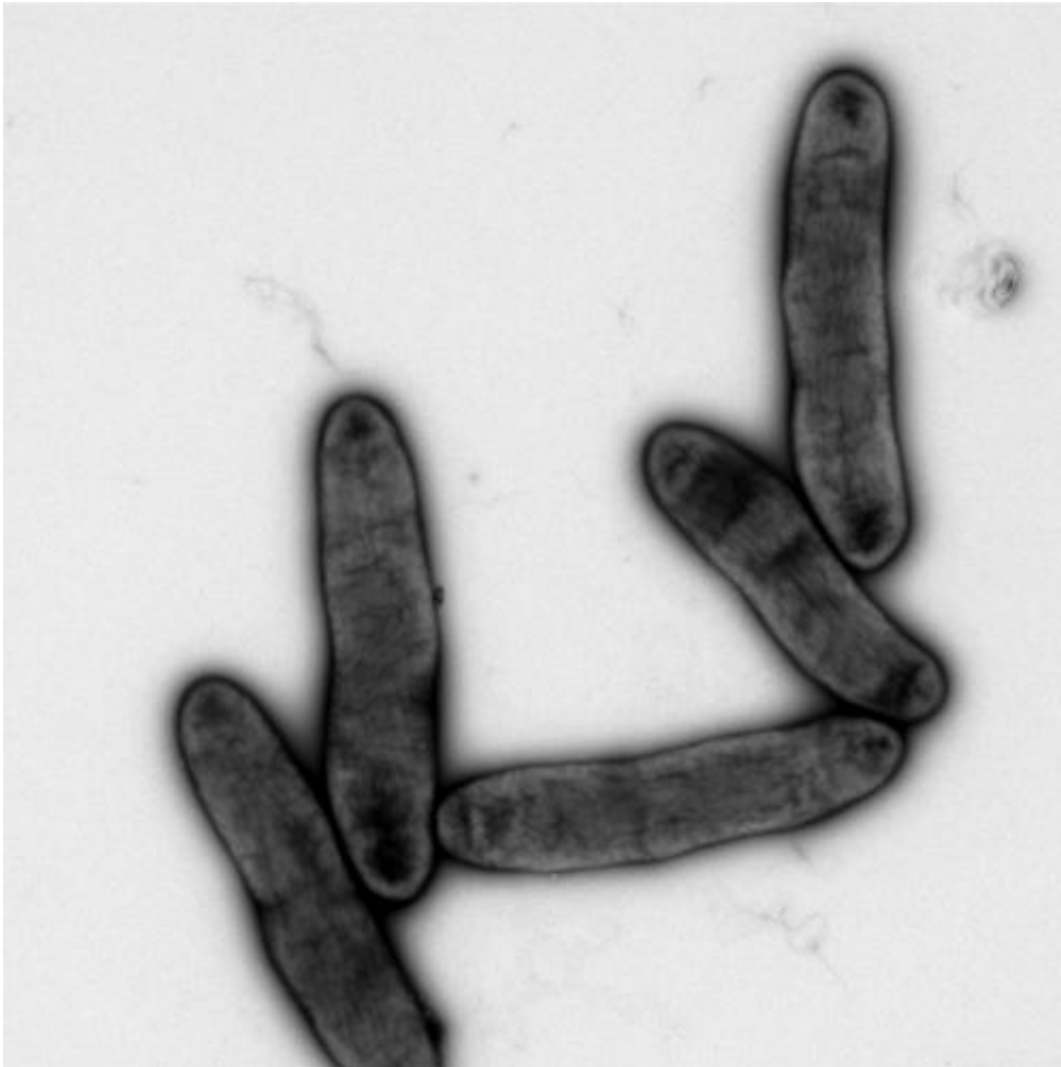


New membrane-synthesis pathways in bacteria discovered

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Xanthomonas campestris. Credit: RUB, Bild: Moser

Biologists at the Ruhr-Universität Bochum (RUB) have discovered new mechanisms used by bacteria to manufacture lipids, i.e. fat molecules, for the cell membrane. Those mechanisms are a combination of familiar bacterial synthesis pathways and of such that occur in higher organisms. Thus, the team headed by Prof Dr Franz Narberhaus and Dr Roman Moser has debunked the long-standing theory that lipid production in bacteria differs substantially from that in higher organisms. The results have been published in the journal "*Molecular Microbiology*".

Potential for the pharmaceutical industry

Many drugs are coated with lipids, because it facilitates uptake by human cells. Synthesising lipids, however, is often a time-consuming and expensive process. Enzymes with new properties may be used to ease manufacture and to reduce production costs. The RUB researchers at the Chair of Microbial Biology have now discovered enzymes that are able to generate a number of different lipids. "The discovery of such biological pathways and their biotechnological optimisation offer great potential for industrial lipid production," says Roman Moser.

Enzyme can produce several lipids

The biologists studied lipid biosynthesis in the bacterium *Xanthomonas campestris*, a plant pathogen. One of the most common bacterial lipids, phosphatidylethanolamine, is produced by the bacterium in different ways: one of them has been long known; another one came as a complete surprise. The enzyme that plays a decisive role in the newly discovered synthesis pathway can also synthesise a structurally completely different lipid, i.e. cardiolipin. "It's conceivable that, in its competitive natural environment, this versatile enzyme helps *Xanthomonas* gain an advantage over other bacteria," speculates Franz Narberhaus.

Studying more than just model organisms

Xanthomonas can also produce the [lipid](#) lecithin that typically occurs in plants and animals, but rarely in [bacteria](#). The RUB team discovered that Xanthomonas does not use any of the two bacterial synthesis pathways hitherto known for this purpose. "In order to challenge the established theories regarding biosynthesis of the [cell membrane](#), it will be worth studying the processes in more than just the conventional model organisms," says Prof Narberhaus.

More information: R. Moser, M. Aktas, F. Narberhaus (2014): "Phosphatidylcholine biosynthesis in Xanthomonas campestris via a yeast-like acylation pathway," *Molecular Microbiology*, [DOI: 10.1111/mmi.12492](#)

R. Moser, M. Aktas, C. Fritz, F. Narberhaus (2014): "Discovery of a bifunctional cardiolipin/phosphatidylethanolamine synthase in bacteria," *Molecular Microbiology*, [DOI: 10.1111/mmi.12603](#)

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