

Facile & Scalable Synthesis of Plant-Based Cholesterol (BotaniChol®) in GMP Grade

25 May 2021, Luxembourg & Magdeburg -- Chemists at CordenPharma and the Otto-von-Guericke-University of Magdeburg, Germany developed a scalable synthesis of pharma-grade cholesterol based on botanical sources. This offers a large-scale production of highly needed cholesterol, which is used as part of the lipid cocktail for the assembly of effective mRNA-based vaccines against the COVID-19 pandemic. These lipids are formulated into the delivery system of the mRNA fragments by forming Lipid NanoParticles (LNP) that introduce the mRNA into the cells. Cholesterol plays a crucial role because it stabilizes the LNP and facilitates endosome escape of the mRNA into the cytosol.

CordenPharma, a Contract, Development & Manufacturing Organization (CDMO) providing full-service manufacturing from APIs to Drug Products, produces a variety of these lipids on a large scale. To complete CordenPharma's lipid offerings, especially at the start of the COVID-19 pandemic, Chemical Project Leader Dr. Lionel Roux started investigations on a synthesis of cholesterol based on plant materials. Then about one year ago, Dr. Adriano Indolese, Head of Global R&D & Innovation at CordenPharma, took advantage of a long-standing and established collaboration with Prof. Dieter Schinzer from the Institute of Chemistry - Faculty of Process & Systems Engineering at the Otto-Von-Guericke-University (OVGU) of Magdeburg, Germany to initiate the further exploration of possible routes to cholesterol. Dr. Adriano Indolese comments, "We have been collaborating very successfully with Prof. Schinzer's group for many years. We highly appreciate the passion and commitment of the team to develop creative syntheses for complex organic molecules."

By the end of 2020, the team achieved a breakthrough in the project resulting in a straightforward, short synthesis of cholesterol that has already been filed for a registered trademark to be named BotaniChol®. Prof. Schinzer states, “After very hard day & night work in the lab, and many brain storming sessions within the collaborating teams, graduate student Maxim Munt and Senior Scientist Dr. Oliver Spieß from our research group achieved the breakthrough and produced the first grams of plant-derived cholesterol.”

Currently, the main quantities of cholesterol for industrial applications are extracted from wool grease of sheep or animal tissues. These sources involve the risk of Transmissible Spongiform Encephalopathies (TSEs) agents via human and veterinary medicinal products.



CordenPharma BotaniChol® is a plant-based cholesterol used in the production of lipids for mRNA vaccines.

The new production process of BotaniChol® with non-animal origin cholesterol avoids any potential animal source of contamination, as it is based solely on chemical transformations starting with plant materials. The patented process will play an important role in overcoming the global shortage of lipids, and finally aid in the production of more life-saving vaccines around the world to fight the pandemic.

Matthieu Giraud, PhD, Director of Global Peptides, and Lipids & Carbohydrates Platforms at CordenPharma explains, “This innovative and cost-competitive process starting from plant derivative, developed jointly with the Otto-von-Guericke-University of Magdeburg, Germany, provides a highly-pure cholesterol BotaniChol® which is required for mRNA vaccines. In addition to our standard phosphocholine, pegylated and cationic lipids, BotaniChol® nicely completes our mRNA lipid offering for global partners involved in fighting the pandemic.”

About Otto von Guericke University of Magdeburg

The Otto von Guericke University Magdeburg was founded in 1993. With nine faculties and almost 14,000 students in around 100 degree programmes, it forms a university center for teaching and research in Saxony-Anhalt. As a profile university with clearly defined contours, the University of Magdeburg has defined its research focus in engineering, natural sciences and medicine. In addition, it sees mathematics and economics, social sciences and humanities as indispensable disciplines for a modern university in the information society. A good 26 percent of all students come from abroad. Around 2,500 graduates leave the university every year after successfully completing their studies, around 200 of them as licensed doctors.

www.ovgu.de

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About CordenPharma

CordenPharma, the global pharmaceutical service & manufacturing platform of International Chemical Investors Group (ICIG), is a full-service partner in the Contract Development & Manufacturing (CDMO) of APIs, Drug Products, and associated Packaging Services. Through a growing network of cGMP facilities across Europe and the US organized under five Technology Platforms – Peptides, Lipids & Carbohydrates, Injectables, Highly Potent & Oncology, and Small Molecules – CordenPharma experts translate complex processes and projects at any stage of development into high-value products.

For more information about CordenPharma, [contact us](#) or visit cordenpharma.com.

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