

German lipidomics experts certain: lipids are the key to combating COVID-19

- Lipidomics proves Hydroxychloroquine is not only ineffective against COVID-19, but can also weaken the immune response
- biotechnologists know: lipids are the weak point of the virus
- fats can be responsible for side and after-effects of corona infection

Dresden (Germany), 6 July 2020

The usefulness of the active ingredient hydroxychloroquine in the fight against COVID-19 has long been doubted. This did not stop US President Donald Trump from praising the drug, which is also used in the fight against malaria, and even recommending it for prevention. With the help of the Lipidomics technology of the Dresden-based biotech company Lipotype, molecular biological proof has now been provided: Hydroxychloroquine is not only ineffective. Its use in corona patients, especially prophylactically, can even weaken the immune response.

"Hydroxychloroquine impairs the natural immune response, which means that the organism becomes even more sensitive to attacks on the immune system," explains Dr. Christian Klose, CTO of German [Lipotype](#). This is molecular biological proof that corona research must concentrate on a different active ingredient.

Lipids are the weak point of the virus

A closer look at lipids might be a promising approach. "We have known for quite some time that viruses, whether influenza or corona, affect the fat metabolism of their host. After all, their own membrane consists of lipids. They have to replicate these with the help of the lipid metabolism of their host in order to protect their genetic material," says the Dresden-based lipidomics expert. The problem: Lipidomics research is still in its infancy. "There are over 2000 lipids that are relevant to our health," explains Dr.

Klose of Lipotype. "We have to find out how they work and how COVID-19 might affect them. That would be a breakthrough."

Lipidomics often makes the difference

The fact that lipidomics, i.e. research on fats, can provide explanations for many questions about the novel virus was recently demonstrated by researchers led by Dutch Dr. Raphaël Duivenvoorden: In their study on the effectiveness of hydroxychloroquine, the Lipotype technology provided the decisive indication. "Many studies in immunology comprise data in the nucleic acid and protein domain, while little is known about events in the lipid domain. Our study reveals that in the development of innate immune memory, a key immunological process, substantial changes occur in cell lipidomics. We discovered this can be blocked by Hydroxychloroquine," says the internist nephrologist from the Medical Center of Radboud University (Netherlands) and Adjunct Assistant Professor at Icahn Medical School at Mount Sinai, New York. "Recognizing and understanding these changes will open up new insight into how these processes are regulated and may inspire the development of novel therapeutic strategies."

Lipids explain side and after-effects of a corona infection

"This also applies to corona research," adds Prof. Kai Simons, CEO and founder of Lipotype. "We have long known about the importance of lipids for the human organism. These inconspicuous molecules influence complex processes - if the lipid metabolism is disturbed, this can have fatal consequences. We know that lipids influence the neuronal system and metabolism, among other things. Lipids could therefore also be part of the explanation for the side and after-effects that are now increasingly seen in corona patients, such as diabetes¹, the loss of the sense of smell and taste or even seizures and strokes²."

Dresden technology enables top research

Lipotype, a spin-off from the world-renowned Max Planck Institute for Molecular Cell Biology and Genetics in Dresden, Germany, is well versed in lipids. The Shotgun Lipidomics technology developed in Dresden under the leadership of the internationally

¹ Nature, 24 June 2020: *Mounting clues suggest the coronavirus might trigger diabetes.*
<https://www.nature.com/articles/d41586-020-01891-8>

² The Scientist, 29 June 2020: *Severe Neurological Ailments Reported in COVID-19 Patients.*
<https://www.the-scientist.com/news-opinion/severe-neurological-ailments-reported-in-covid-19-patients-67676>

renowned Prof. Kai Simons allows researchers from a wide range of disciplines to perform detailed molecular analysis of several thousand different lipids at once.

Link to hydroxychloroquine publication: <https://doi.org/10.1101/2020.06.08.20122143>

Nils Rother, Cansu Yanginlar, Rik G.H. Lindeboom, Siroon Bekkering, Mandy M.T. van Leent, Baranca Buijsers, Inge Jonkman, Mark de Graaf, Marijke Baltissen, Lieke A. Lamers, Niels P. Riksen, Zahi A. Fayad, Willem J.M. Mulder, Luuk B. Hilbrands, Leo A.B. Joosten, Mihai G. Ne-tea, Michiel Vermeulen, Johan van der Vlag, Raphaël Duivenvoorden. *Hydroxychloroquine inhibits trained immunity - implications for COVID-19*. (Preprint).

doi: <https://doi.org/10.1101/2020.06.08.20122143>

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