

The latest news, views, and announcements from MaxImmun

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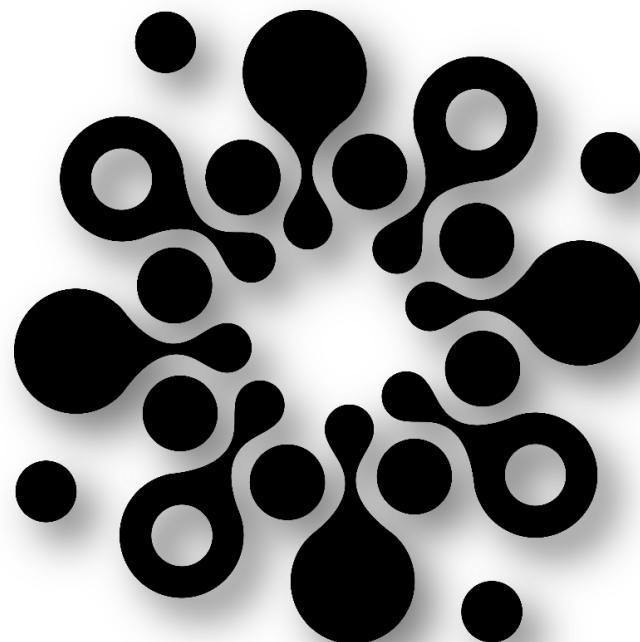
The MaxImmun project

By Brice Sperandio (Ecole Normale Supérieure)

Antimicrobial resistance (AMR) is a growing health threat, considered by international bodies to be one of the top global health priorities. In 2019, it was responsible for 1.27 million deaths worldwide. It is estimated that AMR causes 33,000 deaths per year in Europe. Faced with this scourge, the World Health Organization (WHO) has issued an alarming finding: the clinical pipeline for new antimicrobials is dry.

The golden age of antibiotics is over, and the development of new and innovative therapeutic strategies to fight infections and reduce spread of AMR is urgently needed. With MaxImmun, our European consortium introduces a new concept to fight AMR: the AMP-inducer technology. Based on immuno-stimulatory molecules, this technology aims to selectively boost the expression of the human antimicrobial peptides (AMPs), which are body defences naturally produced at mucosal surfaces.

The novelty of our technology lies in seeking natural molecules that induce a therapeutic expression of our own AMPs, by exploiting the human innate immune system. The technology is introducing a new approach to effectively fight AMR and infectious diseases. Rather than directly targeting a pathogen with exogenous antimicrobials and the risk of resistance development, our technology will promote a natural, endogenous response by leveraging the body's own defences.



This concept will have the advantage to reduce the selection pressure on bacteria and the risk of promoting resistance. Classical resistance formation by low levels of residual antibiotics will be prevented by our technology, thus providing a sustainable solution against AMR that also will protect from resistance spread among animals and in the environment.

Improving natural leads by medicinal chemistry

By Mark Brönstrup (Helmholtz Centre for Infection Research)

Natural products have been the most important source of novel drugs against bacterial infections. In more than 80% of cases, it was necessary to modify the chemical structure of the natural products by synthesis to optimize their properties for human use. We pursue such optimization strategies within MaxImmun.

Natural products have been evolutionary optimized to confer advantages for their producers – microbes, fungi or plants – in their respective natural habitats. However, they are not biosynthesized for human use.



Mark Brönstrup
(Tillmann Franzen for SPRIND)

In order to assure that the natural products are stable enough in the body to fight bacterial infections over hours or days, it is necessary to optimize their properties as drugs by changing their chemical structure. Thanks to a rich arsenal of methods, comprising genetic engineering of strains, biocatalysis, semisynthesis or total synthesis, even complex natural products can be tackled and optimized in a highly versatile manner today.

Portrait of two MaxImmun youth scientists

By Sarah Khazaal (Ecole Normale Supérieure) and William Bourumeau (ImmunRise Technologies)

As two young scientists in the EU-funded MaxImmun project, Sarah Khazaal (Franco-Lebanese postdoctoral researcher in molecular and cellular biology at Ecole Normale Supérieure) and William Bourumeau (French engineer at ImmunRise Technologies), combine their expertise to develop novel marine microbiome-inspired therapies that can combat antimicrobial resistance without promoting inflammation.

Sarah: With a PhD in microbiology and molecular biology, my research has focused on host-microbe interactions, immune modulation, and therapeutic development. In MaxImmun, I'm exploring bioactive compounds and analogues of hit molecules that stimulate human antimicrobial peptides (AMPs) expression. Using intestinal cell models, I'm investigating how these molecules activate AMP pathways independently of inflammatory signaling by examining regulatory mechanisms. This approach holds promise for revolutionizing therapies for chronic inflammatory diseases.

William: With a master's degree in clinical and biomedical sciences, I have developed expertise in immune modulation during viral infections, particularly in relation to the microbiota. In MaxImmun, my skills in molecular and cellular biology contribute to the establishment and optimization of a rigorous analysis pipeline, from molecule selection to validation. I'm exploring novel marine compounds capable of stimulating the expression of human AMPs without triggering inflammation. My work aims to ensure the reproducibility of results as well as technical precision at every stage of the project.



Sarah Khazaal and William Bourumeau
(MaxImmun consortium)

Sarah: Together, we represent the multidisciplinary essence of MaxImmun by pooling our expertise to identify, refine, and validate innovative AMP inducers. Our collaboration shows that true innovation arises when diverse scientific skills come together.

William: What inspires us most about MaxImmun is its visionary and translational focus, which connects basic research directly to impactful therapeutic solutions. We are proud to be part of a team committed to developing safer, smarter immunomodulatory therapies to meet the healthcare challenges of the future.

The MaxImmun General Assembly 2025

By Geoffroy Meillon (Ecole Normale Supérieure)

On July 5th, the MaxImmun consortium gathered near Bordeaux for its General Assembly meeting. This successful event focused on reviewing our 2024 achievements and setting objectives for 2025.



The General Assembly in Bordeaux
(MaxImmun consortium)

Among the many topics discussed, we had a productive conversation about the upcoming Training School, scheduled to take place in the first half of 2026.

Our next steps also include fully involving external experts by convening the External Advisory Board before the end of 2025.

Finally, this newsletter was also discussed during the meeting as an element of our strategic communication, which is primarily led through MaxImmun [website](#) and [LinkedIn](#).



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