

Researchers isolate human antibody that neutralizes four different viruses

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A publication in the renowned scientific journal *Nature* describes a unique human monoclonal antibody (MPE8) discovered by the Swiss Biotech company Humabs BioMed SA in collaboration with the Institute for Research in Biomedicine (IRB) which is affiliated to the Università della Svizzera Italiana (USI).

MPE8, a unique antibody that neutralizes different viruses

MPE8 is the first neutralizing antibody that targets four different human and animal viruses, in particular the [respiratory syncytial virus](#) (RSV) and the metapneumovirus (MPV) that cause severe lower [respiratory tract infections](#). MPE8 represents a new promising drug for the prophylaxis as well as for the therapy of respiratory infections in infants and immunosuppressed patients. MPE8 also identifies a conserved structure shared by different viruses, which could lead to the development of a new vaccine capable of conferring protection against multiple viruses.

High medical need to treat patients infected by RSV and MPV viruses

RSV and MPV are a prominent cause of [respiratory diseases](#) ranging from common cold to severe infection of the [lower respiratory tract](#) and have been implicated in the development of asthma. RSV and MPV

infections can be fatal in newborns and in immunosuppressed patients who have undergone stem cell or [lung transplantation](#) with a mortality up to 40%. A humanized antibody to RSV (Synagis) is currently used for prophylaxis in [premature newborns](#), but is not effective therapeutically. There are no antibodies to prevent MPV infection. Furthermore, vaccines against RSV and MPV are not available. Given the high prevalence of these pathogens and the severity of the diseases caused, there is a strong medical need to develop novel therapies against these [deadly viruses](#).

MPE8 antibody hits the "Achilles' heel" of the viruses

Davide Corti, Head of antibody discovery at Humabs BioMed and first author of the study comments: "This is a remarkable example of the power of the Humabs discovery platform to select, from the human immune response, antibodies with unique properties. Out of the several antibodies identified that neutralized either RSV or MPV, MPE8 was the only one that potently neutralized both viruses. Surprisingly, MPE8 is also active against two other paramyxoviruses of animal origin: bovine RSV and pneumonia virus of mice. Importantly we have been able to test MPE8 in a relevant animal model and found that the antibody has not only prophylactic but also therapeutic activity in a situation where ribavirin, the only antiviral drug available to treat with limited efficacy severe infections in humans, is ineffective. MPE8 antibody binds to the viral fusion protein in a site that is conserved among different viruses and represents a kind of "Achilles' heel" of these viruses. We hope to be able to use this information to develop a new vaccine capable of protecting against multiple viruses".

Antonio Lanzavecchia, director of the Institute for Research in Biomedicine; Professor of Human Immunology at the ETH Zurich, scientific founder of Humabs and senior author of the study comments: "After the isolation of an antibody that neutralizes all human and animal

influenza viruses – that we reported two years ago in the journal *Science* – the identification of MPE8, which neutralizes 4 different paramixoviruses, is a further demonstration of the potential of the antibody discovery technologies that we developed 10 years ago. At that time nobody would have expected that antibodies with such potency and breadth of neutralization could exist. MPE8 is the first antibody that can neutralize viruses belonging to different species. Given its potency and breadth, we are confident that MPE8 represents a strong candidate for prophylaxis and therapy of these life threatening infections".

Exemplary cooperation between university and industry

The discovery of MPE8 is the result of a close collaboration between the IRB, a non-profit Institute performing basic research, and its spin-off, Humabs BioMed, which has licensed the antibody discovery technology developed at IRB and has the resources to bring the antibody to the clinic. This also includes discussions with potential pharmaceutical partners interested in the clinical development of the antibody. IRB and Humabs are complementing each other in promoting the medical progress in the treatment of infectious and other debilitating diseases.

Alcide Barberis, President and CEO of Humabs comments: "This work is an example of the successful and long lasting partnership between the Institute for Research in Biomedicine (IRB) and Humabs and confirms the potential of our Humabs discovery platform to select highly effective human monoclonal [antibodies](#). The exciting results published in *Nature* showing the unique properties of the discovered antibody have raised high interest among clinicians in the field. Synagis (a humanized antibody) is the only RSV-treatment on the market with annual sales close to 1 billion USD. The pool of patients who may need novel RSV and MPV therapies is considerably larger than the group that is currently

treated with Synagis. Over the next decade the market could expand to reach at-risk adults, elderly and children suffering from acute infections. Humabs is in discussions with pharmaceutical companies that have shown interest in bringing the antibody into clinical stages of development."

More information: Corti et al. Cross-neutralization of four paramyxoviruses by a human monoclonal antibody, *Nature*. DOI: [10.1038/nature12442](https://doi.org/10.1038/nature12442). Advance Online Publication (AOP) on www.nature.com/nature

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