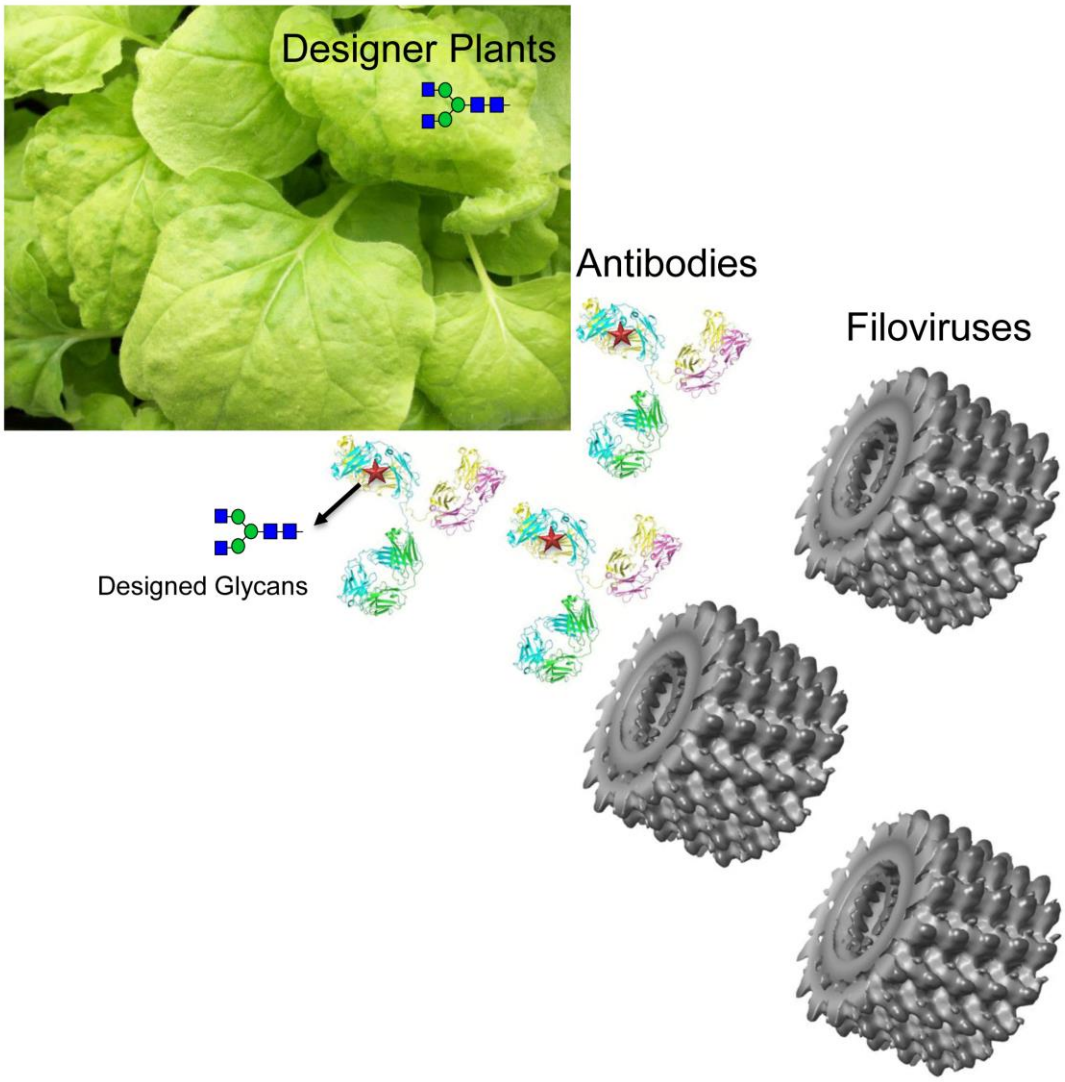
Graphical Abstract:



“One Monoclonal Antibody Protects Against Two Lethal Viruses”
Science Translational Medicine DOI: 10.1126/scitranslmed.aai8711

An interdisciplinary team (consisting of the University of Texas Medical Branch, Galveston, Mapp Biopharmaceutical Inc., San Diego, Vanderbilt University Medical Center, Nashville and the University of Natural Resources and Applied Life Sciences, Vienna) reports that genetically engineered plants generated at BOKU-WIEN are capable of producing antibodies that provide comprehensive protection against lethal Marburg and Ravn virus infections in non human primates. The results are an important step towards the development of new drugs against these deadly infectious diseases. The study is a further proof of the broad application of the "designer plants".
Filoviruses, like EBOLA, Marburg and Ravn viruses, cause acute diseases with a high degree of mortality in humans. Since the first recognized outbreak of the Marburg virus disease in 1967, the disease has proved to be lethal in approximately 80% of the infected persons. The currently inefficient

or missing treatment options make the fight against filoviruses unpredictable as the recent Ebola epidemic (2013-2016) has shown. In searching for a therapy, a US / Austrian research team showed that antibodies produced in genetically modified plants gave a comprehensive protection against Marburg and Ravn viruses. The promising results suggest the development of an efficient therapy. What makes this study unique is the fact that in contrast to the 100% mortality of the untreated animals, full protection is observed in the treated animals.

The study is a series of successful results achieved with genetically modified tobacco plants developed by Prof. Steinkellner and Prof. Strasser. In cooperation with world's leading research institutes the use of these plants for the production of highly effective antibodies, including antibodies against HIV and EBOLA virus, has been demonstrated in more than 10 publications.

Citation: Therapeutic treatment of Marburg and Ravn virus infection in nonhuman primates with a human monoclonal antibody. Sci. Transl. Med. (2017). C. E. Mire, J. B. Geisbert, V. Borisevich, K. A. Fenton, K. N. Agans, A. I. Flyak, D. J. Deer, **H. Steinkellner**, O. Bohorov, N. Bohorova, C. Goodman, A. Hiatt, D. H. Kim, M. H. Pauly, J. Velasco, K. J. Whaley, J. E. Crowe Jr., L. Zeitlin, T. W. Geisbert. DOI: 10.1126/scitranslmed.aai8711

Contact
Herta Steinkellner, Universität für Bodenkultur Wien
Department für Angewandte Genetik und Zellbiologie (herta.steinkellner@boku.ac.at)

The study is based on results from the PhD thesis of Prof. Richard Strasser (DAGZ).

Strasser R, Altmann F, Mach L, Glössl J, Steinkellner H. (2004). Generation of Arabidopsis thaliana plants with complex N-glycans lacking β1,2 xylose and core α1,3-fucose. FEBS Lett. 561:132-6.

Strasser R, Stadlmann J, Stiegler G, Quendler H, Mach L, Glössl J, Pabst M, Steinkellner H. Generation of glyco-engineered tobacco plants for the production of monoclonal antibodies with a homogeneous human-like N-glycan structure. (2008) Plant Biotechnol J. 6:392-402.