Camels give President Obama's Alzheimer's plan a lift

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President Obama's national plan to fight Alzheimer's disease just got a lift thanks to a team of international researchers whose recent discovery may lead to enhanced imaging of and improved drug delivery to the brain. A research report appearing in *The FASEB Journal*, describes an entirely new class of antibody discovered in camelids (camels, dromedaries, llamas, and alpacas) that is able to cross the blood-brain barrier, diffuse into brain tissue, and reach specific targets. Having such antibodies, which are naturally available, may be part of a "game changer" in the outcomes for people with brain diseases that are poorly diagnosed and treated, at best, using today's tools.

"This basic biological investigation opens new pathways toward innovative therapeutic solutions for intractable diseases such as Alzheimer's disease or brain tumors," said Pierre Lafaye, Ph.D., a researcher involved in the work from the Institut Pasteur, PF: Production de Protéines Recombinantes et d'Anticorps –Proteopole in Paris, France. "The importance of this study is the hope that this novel approach may be a useful tool in crossing the blood brain barrier for diagnostic and therapeutic purposes," added Babbette Weksler, MD, Professor of Medicine, Weill Cornell Medical College, New York, NY, another author of the study and editorial board member of *The FASEB Journal*.

Lafaye and colleagues studied alpacas, a member of the camelid family, and discovered an antibody naturally able to cross the blood brain barrier without chemical modification. Then, additional research showed that after these antibodies entered the brain successfully, they diffused into

the brain tissue to reach a target, which in this study was astrocytes. This study shows, for the first time, an antibody penetrated into the brain in vivo, under normal physiological conditions. In addition to the obvious clinical applications of this finding, it opens the doors to new research involving the body's systems for recognizing self v. "nonself."

"Camels may be most famous for helping people travel to the outermost reaches of the desert, but soon they could be also known for helping us reach the innermost parts of our brains," said Gerald Weissmann, M.D., Editor-in-Chief of *The* FASEB Journal. "It appears that these prized animals are far more capable of helping get to hard-to-reach places than we ever could have imagined."

More information: Tengfei Li, Jean-Pierre Bourgeois, Susanna Celli, Fabienne Glacial, Anne-Marie Le Sourd, Salah Mecheri, Babette Weksler, Ignacio Romero, Pierre-Olivier Couraud, François Rougeon, and Pierre Lafaye. Cell-penetrating anti-GFAP VHH and corresponding fluorescent fusion protein VHH-GFP spontaneously cross the blood-brain barrier and specifically recognize astrocytes: application to brain imaging. *FASEB J* October 2012, 26:3969-3979; doi:10.1096/fj.11-201384