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Scientists Identify Cooperative Effects of Vitamin D and Active Chemical in Curry that Stimulates the Immune System to Clear Amyloid Plaques in Alzheimer's Disease

Research suggests a new approach to natural medications development and therapy

San Diego, Calif. (July 13, 2009) - Human BioMolecular Research Institute (HBRI), a leading non-profit research institute, announced today that in a study conducted jointly with UCLA and UC Riverside, and published in the July 2009 issue of the *Journal of Alzheimer's Disease,* a potentially new approach to treating Alzheimer's disease was discovered. Previous findings link immune system defects to the accumulation of amyloid-beta, a peptide that forms plaques found in Alzheimer's disease. Curcumin, an active ingredient found in the spice turmeric (yellow curry), was found to help boost the immune system in clearing amyloid-beta. Turmeric is often used in curry dishes among human populations associated with lower rates of Alzheimer's disease. Until recently, the mode of action of curcumins in stimulating immune cells was unknown; however the current research indicates a likely interaction between curcumin compounds and the cellular receptor for vitamin D3.

This essential vitamin, produced by the skin in response to sunlight, interacts with cellular receptor molecules to trigger a variety of responses leading to maintenance of proper mineral levels in the blood, and the stimulation of immune cells to clear pathogens and other materials including amyloid-beta. Through the probable binding to different pockets within the vitamin D receptor, it was shown that curcumins and vitamin D3 cooperate to enhance immune cell stimulation and clearance of amyloid-beta by Alzheimer's patients' cells. Further, it was found

that two groups of Alzheimer's patients can be distinguished based on the response of their immune cells to curcumins plus vitamin D3.

"These findings suggest the molecular mechanism by which curcumins exert their amyloid-clearing effects on Alzheimer's patients' immune cells," according to John Cashman, Ph.D, HBRI Director and co-author of the publication with Dr. Milan Fiala of UCLA.

The study provides more insight into a role of the immune system in Alzheimer's disease and points to a novel therapeutic approach. Work is ongoing at HBRI to chemically optimize the natural product curcumins for improved potency and better drug-like qualities. The possibility to test a patient's immune response with a blood sample suggests opportunities for individualizing treatments involving new, more effective curcumins and/or vitamin D3. Expression of certain genes with a known association to the immune cell amyloid-clearing process may be another approach to characterize immune cell response.

"This is a fascinating study, as it shows differences between individuals with and without Alzheimer's disease in how their immune systems work in removing amyloid-beta. This study brings together what were previously disparate areas of research and points to exciting new therapeutic strategies for Alzheimer's disease. The synergy between the effective natural product in curry and a common vitamin suggests exciting opportunities for a nutriceutical approach to treating Alzheimer's disease", said Dr. Nicholas J. Schork, Director of Research, Scripps Genomic Medicine and Professor of Molecular and Experimental Medicine, The Scripps Research Institute.

The work expands previous studies suggesting that small molecules can stimulate the immune system and have a beneficial effect on complex diseases such as Alzheimer's disease.

About HBRI: The Human BioMolecular Research Institute is a non-profit research institute conducting basic research focused on unlocking biological and chemical principles related to diseases of the human brain. HBRI conducts fundamental studies of central nervous system disorders and other diseases and translates findings into new drug development to address human illness. In addition, the institute promotes scientific learning through community service and

public access by disseminating information and sharing research with collaborators, colleagues and the public. For more information, visit **www.HBRI.org**.

About UCLA: The University of California Los Angeles is one of the premier research universities in the world. Dr. Milan Fiala is a researcher with the David Geffen School of Medicine at UCLA and the VA Greater Los Angeles Healthcare System. Dr. Fiala is a consultant for MPBio and also serves in the company's speaker's bureau.

About UC Riverside: The Institute for Integrative Genome Biology (IIGB) at UC Riverside embraces advances in genomics technologies and the current trend for increasingly multi-disciplinary research in projects exploring the development of more nutritious foods, disease- and flood-resistant crops, alternative fuel sources and new medical and pharmaceutical treatments, to name a few. Mathew Mizwicki is an Asisstant Research Biochemist in the Biochemistry Department at IIGB.