

21st Annual European Pharma Congress

May 20-22, 2019 | Zurich, Switzerland

Chronic infection in Alzheimer's disease and type 2 diabetes

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Strong epidemiologic evidence and common molecular mechanisms support an association between Alzheimer's disease (AD), type 2-diabetes and several other chronic inflammatory disorders. Local inflammation and amyloidosis occur in both diseases and are associated with periodontitis and various infectious agents. Here we discuss accumulated evidence for the presence of local inflammation and bacteria in Alzheimer's disease and type 2 diabetes and discuss host pathogen interactions in chronic inflammatory disorders. Spirochetes, *Chlamydomypha pneumoniae* and *Helicobacter pylori* are demonstrated in association with dementia and brain lesions in AD and islet lesions in type 2 diabetes. The presence of pathogens in host tissues activates immune responses through Toll-like receptor signaling pathways. Evasion of pathogens from complement-mediated attack results in persistent infection, inflammation and amyloidosis. Amyloid beta and the pancreatic amyloid called amylin bind to lipid bilayers and produce Ca^{2+} influx and bacteriolysis. Similarly to AD, accumulation of amylin deposits in type 2 diabetes may result from an innate immune response to chronic bacterial infection, which are known to be associated with amyloidosis. Further research based on an infectious origin of both AD and type 2 diabetes will lead to novel treatment strategies.

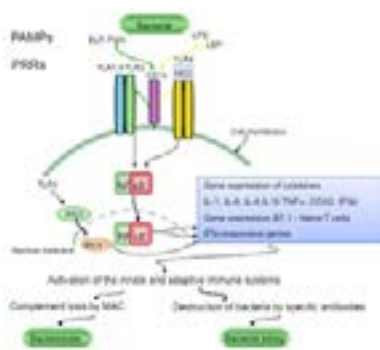


Figure 1. LTR signaling in host defenses against pathogens. (Ref 2 Fig 1)

Recent Publications

1. Miklossy J. (2015) Historic evidence to support a causal relationship between spirochetal infections and Alzheimer's disease. *Front Aging Neurosci.*; 7: 46.
2. Miklossy J, McGeer PL (2016) Common mechanisms involved in Alzheimer's disease and type 2 diabetes: a key role of chronic bacterial infection and inflammation. *Aging (Albany NY)* 8:575-88..
3. Miklossy J. (2016) Bacterial Amyloid and DNA are Important Constituents of Senile Plaques: Further Evidence of the Spirochetal and Biofilm Nature of Senile Plaques. *J Alzheimers Dis.* 53:1459-73.
4. Feng J, Zhang S, Shi W, Zubcevic N, Miklossy J, Zhang Y. (2017) Selective Essential Oils from Spice or Culinary Herbs Have High Activity against Stationary Phase and Biofilm *Borrelia burgdorferi*. *Front Med.* 11;4:169.

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5. Miklossy J. Ed. (2017) Handbook of Infection and Alzheimer's Disease Advances in Alzheimer's Disease. Series Eds: Perry G, Smith MA, Ashford JW. IOS Press, Amsterdam, 2017, Vol 5, pp 420.

Biography

Judith Miklossy has received her MD, PhD degrees and Board certificates in neurology FRCP(H), then in psychiatry and psychotherapy with EU and AELE conform certificates, from the Faculty of Medicine of the University of Debrecen, and the National Board of specialization in Hungary. She has received the university degrees of Privatdozent (DSc, assistant professor) and Master of Education and Research (MER) and Board certification in Neuropathology FRCP(CH) at the University of Lausanne and the Swiss Medical Federation (FMH) in Switzerland. She was head of the Neurodegeneration research group at the University Institute of Pathology (CHUV, Lausanne), Switzerland, for over ten years. She has done molecular biology research and participated in the introduction of Alzheimer's research in Temple University, Philadelphia, USA. She headed the neuropathology division of Kinsmen Laboratory of Neurological Research, in The University of British Columbia, Vancouver, Canada. She is actively involved in research on Alzheimer's disease, other neurodegenerative diseases and Lyme disease for more than 25 years. Presently she is director of the Prevention Alzheimer International Foundation and International Alzheimer Research Center in Switzerland. Her presentations on international meetings and her publications were repeatedly considered for CME and press releases.

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