Differential Expression of Angiotensin Converting Enzymes in Lymphatic Endothelial Cells Correlation to Clearance of Amyloid-beta

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A major biomarker of Alzheimer's disease (AD), a neurodegenerative disease, is amyloid-beta (Ab42) plaques found in the brains of AD patients. Clearance of amyloids is normally conducted by the body, however it is hypothesized that AD brains cannot properly clear Ab42 leading to over accumulation and eventually AD. Recent studies using transgenic mouse-models of AD suggest a clearance pathway for Ab42 peptides from the brain to the cervical and axillary lymphatics. "Ab concentration was low to undetectable in splenic lymphoid tissue strongly suggesting that Ab peptides in lymph nodes are derived from the brain." Angiotensin converting enzymes (ACE) is an amyloid-degrading enzyme. ACE indirectly increases blood pressure by causing constriction of blood vessels. The possibility that ACE expression in lymphatic endothelial cells aid in Ab42 clearance is still unknown. This study analyzed ACE protein content and expression using Western blot after exposure of Ab42 suggesting it's importance in the clearance process. Western blot found no expression of ACE in neither the control or treated cells. Blots were then imaged for LYVE-1 and found that the exposure of Ab42 disrupted normal expression in endothelial cells. Image analysis showed the physical changes of the cells due to Ab42, including the greater number of aberrant cells, larger area of aberrant cells, smaller area of normal cells, and smaller aberrant and normal nuclei in the treated group. This suggests that in AD, the lymphatics undergo major damaging effects when Ab42 peptides are present. This study provided baseline data about the clearance of Ab42 into the lymphatics.