

Case ID:M10-038L

Published: 4/14/2023

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Bi-specific Antibodies as a Therapeutic for Alzheimer's Disease

Alzheimer's disease (AD) is one of the most prominent and feared neurodegenerative diseases associated with aging. A hallmark of this disease is the formation of extra-cellular amyloid plaques in the brain. The principle component of these extracellular plaques is amyloid- β protein (A β). Though the mechanisms underlying Alzheimer's disease pathology remain controversial, accumulation and deposition of A β appears to play a critical role in the pathogenesis of AD.

Amyloid- β protein is formed through cleavage of amyloid precursor protein (APP) by beta-secretase. Alternatively, cleavage of APP by alpha-secretase, results in a non-pathogenic outcome and no accumulation of A β . A viable therapeutic approach therefore might be to facilitate the clearance and reduction of A β by targeting these pathways.

Researchers at Arizona State University have successfully synthesized a bi-functional recombinant antibody as a treatment for AD. The bi-specific construct is composed of two single chain antibody fragments (scFV): one that blocks beta-secretase activity by binding to the substrate APP (but not A β), and a second that promotes alpha-secretase activity by specifically cleaving at the alpha-secretase site of A β or APP.

This invention may have significant potential as an effective therapeutic for AD.

Potential Applications

- Antibody to treat Alzheimer's Disease

Benefits and Advantages

- Non-inflammatory: Antibody fragment is derived from a humanized library
- Specific: The antibody fragment binds to amyloid precursor protein without cross-reacting with amyloid- β protein
- Bifunctional: The antibody fragment blocks formation of A β and promotes non-pathogenic (alpha-secretase mediated) cleavage of amyloid precursor protein

For more information about the inventor(s) and their research, please see [Dr. Sierks' directory webpage](#)[Dr. Sierks' laboratory webpage](#)

