

# Advancing Knowledge Discovery for Alzheimer's Disease: The Alzforum Experience

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**Abstract.** Alzheimer's disease (AD) is the most common form of dementia and, of the top 10 causes of death in the United States, it is the only one that cannot be prevented, slowed, or cured. According to The World Alzheimer Report 2015, more than 46 million people currently live with dementia, at a worldwide cost of \$818 billion. Current projections show those numbers rising steeply, with the number affected expected to nearly triple to 131.5 million by 2050, and the cost to soar past \$1 trillion in the next three years.

Alzforum ([www.alzforum.org](http://www.alzforum.org)) is an open-access online resource focused on advancing the understanding of AD and finding effective treatments. Established in 1996, Alzforum has become a trusted resource for AD researchers, an online publication where scientific findings are put into context, consumed, and debated, and new ideas and collaborations are cultivated.

With a team of science journalists and curators who continuously monitor the scientific literature, attend conferences, and discuss new developments with researchers, the Alzforum website has amassed two decades of AD research knowledge in the form of original news articles, conference reports, webinars, and scientific databases related to genetics, research tools, and therapeutics. More importantly, the Alzforum team has successfully engaged the scientific community, whose members regularly share their ideas through commentaries and webinars and collaborate to create and maintain scientific databases. Alzforum is read daily by researchers from around the world, and expects to exceed 2 million page views in 2015.

Alzheimer's is a complex neurodegenerative disease for which the underlying cause is unknown. Neuropathologically, it is characterized by amyloid plaques comprised of beta-amyloid derived from APP, and neurofibrillary tangles comprised of hyperphosphorylated tau protein. Mutations in APP as well as two other genes involved in APP processing, PSEN1 and PSEN2, have been found to cause early onset AD. Genome-wide association studies (GWAS), including a recent analysis of more than 74,000 AD patients, have identified additional risk genes for late-onset AD, providing researchers with biological pathways to explore.

Moving science from bench to bedside is an incremental process pushed forward by research teams around the world. Research findings are largely communicated through peer-reviewed papers, and each week Alzforum adds about 200 citations to its Papers database, a repository of more than 100,000 citations related to AD. In the process, relevant data are curated into the site's mutations,

research models, therapeutics, and other databases. The website is built on a Drupal platform. Content is stored in databases in a variety of content types, and shared taxonomies are used whenever applicable. (For example, the genes referenced in the Alzforum databases are stored in a common gene taxonomy.) Given the many established and ongoing efforts to develop biomedical ontologies, the Alzforum taxonomies were built to facilitate mapping to external ontologies in the future. The Alzforum team has lent their expertise to participate in the curation of AD-related protein entities into PRO, a protein ontology that is the resource for the research community and will serve as one of the first steps in linking Alzforum content to the life-science-linked data network. Alzforum continues to look for opportunities to enhance the knowledge discovery process. Building semantic relationships through ontologies will enable the retrieval of related content both within the site and to external data.

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