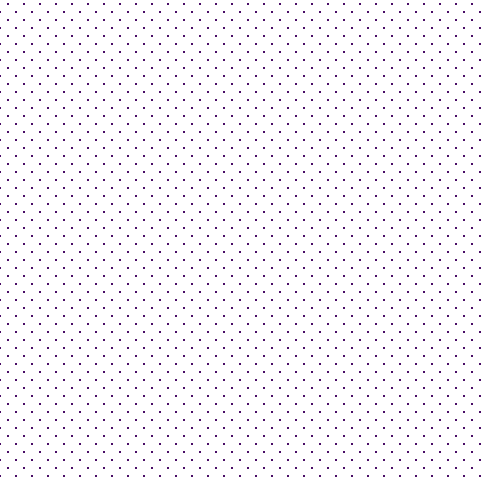


Evidence-Linked Knowledge Graph for Alzheimer's Disease: Integrating Biomarkers, Mechanisms, and Clinical Outcomes

Abstract #13887

Jesus Domech More | AAIC 2026 · Developing Topics: Biomarkers · Exhibit Hall · In-Person Poster · July 12, 2026

An evidence-linked knowledge graph integrates fragmented Alzheimer's disease biomarker, mechanism, and clinical evidence with full source traceability — revealing both consolidated knowledge hubs and critical research gaps.

INTRODUCTION	METHODS	RESULTS	CONCLUSIONS	REFERENCES
The Problem: Fragmented Knowledge Alzheimer's disease research spans multiple domains — molecular mechanisms, biomarkers, imaging, clinical phenotypes, and therapeutic interventions. Despite abundant evidence, knowledge remains fragmented across heterogeneous data sources and publications, limiting integrative understanding and systematic hypothesis generation. Existing knowledge graph implementations often lack strict linkage to documentary evidence, reducing traceability and interpretability. Objective: Build an Evidence-Obligatory Graph To develop an evidence-linked ontological graph of Alzheimer's disease that preserves full traceability from each graph element back to its source document, enabling robust semantic integration and hypothesis generation.	Structured Extraction Pipeline - Corpus curation: scientific documents on Alzheimer's disease biomarkers, mechanisms, imaging, and clinical outcomes. - LLM extraction: entities and relations extracted using large language models under a predefined semantic contract, capturing biomarkers, pathways, interventions, clinical endpoints, and brain regions. - Evidence linkage: each relation explicitly linked to supporting evidence, including document identifiers and textual spans. - Graph analytics: degree centrality and component analysis to characterize structural properties and identify core subgraphs. Graph Architecture — Two Complementary Layers Exploratory Graph (vNEXT): 1,069 nodes · 1,821 edges. Top 150 highest-degree entities and neighbors. Supports navigation, ranking, random walks, and embedding-based hypothesis generation. Evidence-Obligatory Graph: stricter layer requiring explicit documentary support for each edge. Reveals true topology, including fragmentation and knowledge gaps. Key Graph Metrics: 1,069 nodes (vNEXT subgraph) · 1,821 edges (vNEXT subgraph) · 150 highest-degree hub entities · 100% of edges with evidence support.	Key Findings The resulting ontological graph integrates heterogeneous biomedical knowledge into a unified structure with thousands of evidence-supported relations. The strict evidence-based graph revealed a fragmented topology with multiple connected components, indicating both consolidation and gaps in current knowledge. Central Hub Entities — Top-Degree Nodes Identified Alzheimer's Disease, Key Biomarkers, Therapeutic Agents, Amyloid PET, Tau PET, APOE ε4, p-tau217, Brain Regions, Clinical Endpoints, Molecular Pathways. Semantic Clusters The graph enabled identification of semantically meaningful clusters linking molecular mechanisms, biomarkers, and clinical outcomes, as well as underconnected regions suggesting knowledge gaps. Evidence linkage ensured full traceability from graph elements back to source documents.	This study demonstrates the feasibility of constructing an evidence-linked ontological graph of Alzheimer's disease that integrates heterogeneous knowledge while preserving traceability. The framework provides a robust foundation for semantic integration, systematic exploration, and hypothesis generation, supporting future applications in knowledge-driven discovery, biomarker integration, and translational research.	Source corpus and full evidence linkage tables available upon request from the authors. 1,069 Nodes (vNEXT subgraph) 150 Highest-degree hub entities 1,821 Edges (vNEXT subgraph) 100% Edges with evidence support CONTACT  Jesus Domech More AAIC 2026 · Developing Topics: Biomarkers Exhibit Hall · In-Person Poster. Abstract #13887 