

Eugene — Presentation Talking Points

Agentic Biomedical Competitive-Intelligence Platform

- 1. Agentic intelligence, not just search** Eugene is a conversational AI agent that *reasons* over a biomedical knowledge graph. It plans multi-step tool calls (ReAct: Reason → Act → Observe) instead of returning flat search results.
- 2. Curated knowledge graph at its core** A Neo4j graph with **44 node types and 31 relationship types** — drugs, diseases, genes/proteins, pathways, clinical trials, patents, and organizations — capturing how biomedical entities connect.
- 3. Live reasoning-graph visualization** Every answer materializes the agent's reasoning path as an interactive graph in real time. Users see which nodes and relationships the agent traversed — not just the text answer.
- 4. Real-time data, not a stale snapshot** (*headline new capability*) Beyond the static graph, Eugene pulls **live data** from ClinicalTrials.gov (recruiting trials, sponsors, phases), Europe PMC (latest literature + patents), and PubMed — fetched at query time.
- 5. Static + live data fusion** A single question blends curated graph facts with real-time web sources in one answer — e.g. *"What does Eugene know about Hemophilia A, and what are the most recent trials?"* — with citations distinguishing the two.
- 6. Full explainability & provenance** Every asserted fact carries a citation `[node_id, tool]`, and the UI traces evidence and lineage — critical for regulated pharma / competitive-intelligence contexts where answers must be auditable.
- 7. Multi-step relationship reasoning** Eugene chains tools intelligently — resolving an organization name → its ID → its assets, or walking gene-protein neighbors → their clinical trials — answering multi-hop questions a keyword search cannot.
- 8. Enterprise-grade, model-agnostic architecture** Pluggable LLM backends (OpenAI / Anthropic / AWS Bedrock), JWT auth with user allowlisting, and a clean separation: UI ↔ Agent ↔ MCP tool server ↔ Neo4j — each independently scalable.
- 9. Extensible via MCP (Model Context Protocol)** New capabilities are added as tools, not rewrites. Drop in a new graph tool or live-data tool and the agent discovers it automatically — future-proof for new data sources and skills.
- 10. Deployed and demo-ready, anywhere** Runs as a containerized stack — locally via Docker or on AWS (EC2 / Terraform) — with streaming responses, multi-turn conversations, and a polished Next.js UI featuring a live context graph.

30-second pitch

Eugene is an agentic biomedical competitive-intelligence platform. It combines a curated 44-type knowledge graph with real-time clinical-trial, patent, and literature search — and shows its reasoning as a live, explainable graph with full source citations. Ask it a question in plain English, and watch it plan, query, and connect the evidence in front of you.

Demo questions (in order)

#	Question	Capability shown
1	"What assets does CSL Behring have?"	Graph traversal + reasoning-graph viz
2	"Find the gene-protein neighbors of Factor VIII and which clinical trials reference them."	Multi-hop relationship reasoning
3	"Find the latest recruiting clinical trials for emicizumab."	Real-time clinical trials (<i>enable Web chip</i>)
4	"Search the latest literature and patents on emicizumab."	Real-time literature + patents (<i>enable Web + PubMed</i>)
5	"What does Eugene know about Hemophilia A, and what are the most recent trials for its treatments?"	Static graph + live data fusion (<i>enable all chips</i>)

Tech stack at a glance

Knowledge Graph Neo4j 5.26 · **Agent** Strands + FastAPI · **LLM** OpenAI GPT-4.1 (also Anthropic / Bedrock) · **Tools** MCP (Model Context Protocol) · **UI** Next.js 14 + Cytoscape · **Live sources** ClinicalTrials.gov · Europe PMC · PubMed · **Deploy** Docker / AWS EC2 / Terraform