🧬 Bio-Semantic Knowledge Engine – DNA-Aware OODB Layer

🔍 Purpose:

To establish a foundational data structure that integrates semantic intelligence, object persistence, and adaptive learning into the Bio-Quantum AI Trading Platform's knowledge and behavior architecture.

🧱 Core Data Structure ("Knowledge Genome")

Each **Knowledge Object Node** consists of:

Field	Description
`Genotype_ID`	Immutable unique identifier across all systems
`Phenotype_Flags`	Renderable UI traits: icon, theme, visibility
`Ontology_Class`	Class type used in semantic logic (e.g., AI.Agent.RL)
`Relational_Bonds`	Typed links to other objects (causal, structural, associative)
`Semantic_Bond_Weight`	Weighted significance between nodes (AI-trained)
`Access_Transcript`	Permissions, provenance, version lineage
`Signal_Flag`	Triggers for AI-agent awareness or UX activation
`Conceptual_Lineage`	Ancestor-descendant thread tracking
`Keyword_Halo`	Search-enriched semantic tags and triggers

🛡️ Cross-System Integration

1. AI ChatBot / Knowledge Nuggets

- Nodes with `Signal_Flag: true` auto-surface in relevant AI queries.
- `Access_Transcript` controls public/private response rendering.

2. Investor Demo UI (Mouseover)

- `Phenotype_Flags` determine tooltip styling and visibility.
- Hover or click reveals linked Notion blocks via `Relational_Bonds`.
- Optional branded tooltip with monetization metadata.

3. RL Agent Training Layer

- `Semantic_Bond_Weight` adjusts RL state relevance dynamically.

• Knowledge objects feed real-time signal influence to model state vectors.

Evolving Ontology

• Self-expanding ontology driven by tagged user interaction.
• Nodes may spawn sub-nodes via reinforcement logic (new tutorials, sub-concepts).
• Hybrid symbolic/sub-symbolic structure.

📈 Use Case Applications

• Instant glossary and onboarding enrichment
• Component auto-documentation with traceable lineage
• Multi-tenant content isolation + access control
• Automatic content highlighting across AI and UI
• Ad placement/sponsorship tracking within tooltips

🔐 Security/Permissions Layer

• `Access_Transcript` includes:
• Creation chain
• NDA flag
• Print/Copy restrictions
• Tiered visibility (Public, Investor, Internal)

🛠 Next Steps

1. Define sample object schema in YAML/JSON-LD
2. Draft Notion schema alignment (page/tag ID mapping)
3. Prototype tooltip metadata flow for onboarding UI
4. Consider IP/patent pre-brief for knowledge graph implementation

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