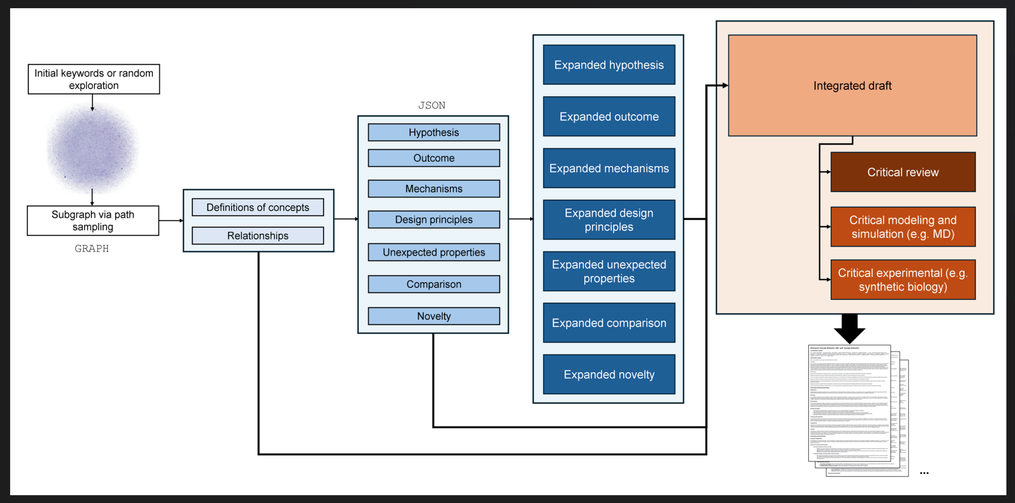
METHODOLOGIES

V0: Hypothesis Generation (Ghafarollahi & Buehler, 2024)

tl;dr

The baseline methodology for hypothesis generation is based on the approach introduced by Ghafarollahi & Buehler (2024). The system uses a multi-agent AI framework to generate and evaluate scientific hypotheses through five main phases:

1. **Knowledge Mapping**: Generates conceptual pathways between scientific concepts in a knowledge graph
2. **Concept Analysis**: Defines and contextualizes the relationships between identified concepts
3. **Hypothesis Generation**: Synthesizes a comprehensive research proposal with seven key aspects
4. **Proposal Refinement**: Critically expands each aspect with scientific depth and quantitative details
5. **Evaluation**: Assesses the proposal's strengths, weaknesses, and novelty against existing literature



Research Proposal Generation Diagram. Source: Ghafarollahi & Buehler (2024)

References

Ghafarollahi, A., & Buehler, M. J. (2024). *SciAgents: Automating scientific discovery through multi-agent intelligent graph reasoning* (No. arXiv:2409.05556). arXiv. https://doi.org/10.48550/arXiv.2409.05556