

Metabolic Flux Hierarchy: Multi-Scale Information Cascades Through Metabolic Pathways

Drug-induced modulation of hierarchical flux propagation: Metformin enhances flux (61.7% end-to-end), Insulin Resistance impairs cascade (3.9% end-to-end), Lithium maintains baseline dynamics

(A) Hierarchical Flux Cascade Across Metabolic Levels

(B) Information Compression Through Metabolic Hierarchy

