Enzymatic Tunneling: Kinetic isotope effects (KIE) significantly exceeding classical limits (e.g., for dihydrofolate reductase) provide strong evidence for quantum mechanical tunneling of protons in enzyme-catalyzed reactions (Nagel & Klinman, Nat. Chem. Biol. 2009, 5, 543-550). This suggests tunneling is a refined catalytic tool, not a random anomaly.

Orch-OR Theory: Penrose-Hameroff's Orch-OR theory proposes that quantum computations in microtubules, shielded from decoherence, undergo objective reduction (waveform collapse) linked to fundamental spacetime geometry, potentially giving rise to conscious moments (Hameroff & Penrose, Physics of Life Reviews, 2014, 11, 39-78). It remains controversial due to decoherence concerns.

Synaptic Tunneling: Theoretical models suggest electron tunneling may play a role in the precise triggering of synaptic vesicle fusion, potentially representing a fundamental quantum-informational event in neural signaling (Fisher, Annals of Physics, 2015, 362, 593-602).

Quantum Information Metrics: Tools like discord and negativity are being adapted to quantify non-classical correlations in biological systems, moving beyond simply detecting coherence to understanding its informational role (Lloyd, Journal of Physics: Conference Series, 2011, 302, 012037).