

Self-Organized Bioelectricity via Collective Pump Alignment

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Abstract

This paper presents a structured synthesis of current regenesis evidence around self-organized bioelectricity via collective pump alignment. It consolidates the ongoing research pipeline into a publication-ready narrative with explicit validation constraints, claim-to-evidence continuity, and next-step falsification criteria.

Keywords

bioelectricity, chemiosmosis, pump alignment, origin of life

Background and Motivation

Autodraft · Self-Organized Bioelectricity via Collective Pump Alignment Physical Origin of Chemiosmosis · Cohera Lab Cohera Lab Home Research Cosmos Regenesis Ethos Publications About Autodraft: Self-Organized Bioelectricity via Collective Pump Alignment Physical Origin of Chemiosmosis Date: 2026-02-23 · Thread: regenesis · Status: extracted-draft · Confidence: low-medium Source chatgpt/pdf/Self-Organized_Bioelectricity_via_Collective_Pump_Alignment_Physical_O... DOI: not detected automatically. Auto summary (preview-based) Self-Organized Bioelectricity via Collective Pump Alignment: Physical Origin of Chemiosmosis Ryosuke Nishide * and Kunihiko Kaneko arXiv:2602.16171v1 [physics.bio-ph] 18 Feb 2026 Niels Bohr Institute, University of Copenhagen, Jagtvej 155 A, Copenhagen N, 2200, Denmark Chemiosmosis maintains life in nonequilibrium through ion transport across membranes, yet the origin of this order remains unclear. We develop a minimal model in which ion pump orientation and the intracellular electrochemical potential mutually reinforce each other. Evidence quote: "We develop a minimal model in which ion pump orientation and the intracellular electrochemical potential mutually reinforce each other." Page hint: 1-2 Claim: This model shows that fluctuations can induce collective pump alignment and the formation of a membrane potential. Evidence quote: "This model shows that fluctuations can induce collective pump

Core Claims and Evidence Continuity

laim to high confidence. Evidence & citations Source file: chatgpt/pdf/Self-Organized_Bioelectricity_via_Colle... Extraction scope: 1-2 Abstract/preview extracted automatically. Claim → evidence mapping (auto) Claim: Self-Organized Bioelectricity via Collective Pump Alignment: Physical Origin of Chemiosmosis Ryosuke Nishide * and Kunihiko Kaneko arXiv:2602.16171v1 [physics.bio-ph] 18 Feb 2026 N... Evidence quote: "Self-Organized Bioelectricity via Collective Pump Alignment: Physical Origin of Chemiosmosis Ryosuke Nishide * and Kunihiko Kaneko arXiv:2602.16171v1 [physics.bio-ph] 18 Feb 2026 Niels Bohr Institute, University of Copenhagen, Jagtvej 155 A, Copenhagen N, 2200, Denmark Chemiosmosis maintains life in nonequilibrium through ion transport across membranes, yet the origin of this order remains unclear." Page hint: 1-2 Claim: We develop a minimal model in which ion pump orientation and the intracellular electrochemical potential mutually reinforce each other. Evidence quote: "We develop a minimal model in which ion pump orientation and the intracellular electrochemical potential mutually reinforce each other." Page hint: 1-2 Claim: This model shows that fluctuations can induce collective pump alignment and the formation of a membrane potential. Evidence quote: "This model shows that fluctuations can induce collective pump

Validation / Falsification Checklist

- Re-check all central claims against primary sources and DOI-linked material.

- Mark confidence per claim and separate inference from evidence.
- Require at least one independent corroborating source before final publication promotion.

Operational Next Steps

alignment and the formation of a membrane potential." Page hint: 1-2 Falsification / validation checklist Re-read full source and verify the central claim sentence-by-sentence. Cross-check against at least one independent source before promotion. Keep confidence at low-medium until replication or corroboration is explicit. Next queries What is the smallest testable claim from this source?