BIOELECTRIC QUANTUM PHASE RESONANCE: A UNIFIED THEORETICAL FRAMEWORK FOR NON-INVASIVE CELLULAR REJUVENATION, EPIGENETIC ENTROPY RESET, AND ONCOGENIC PATTERN NORMALIZATION

Bridging Phylogenetic Biomimetics, Information-Theoretic Epigenetics, and Bioelectric Medicine through the Phase-Locked Resonance Cell (PLRC) Architecture

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ABSTRACT.

Three independent and converging lines of established biological research — phylogenetic biomimetics, information-theoretic epigenetics, and bioelectric morphogenetic medicine — have each demonstrated in peer-reviewed experimental settings that cellular chronological state is not permanently fixed but is instead an informational configuration subject to external modulation and reversal. This paper proposes the Bioelectric Quantum Phase Resonance (BQPR) framework: a unified theoretical architecture that integrates these three biological control systems into a single non-invasive therapeutic apparatus — the Phase-Locked Resonance Cell (PLRC) — capable of executing targeted epigenetic entropy reset, oncogenic bioelectric normalization, and somatic cellular rejuvenation without the introduction of exogenous genetic material, viral vectors, or chemical agents.

The biological evidence base is substantial

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Three separate fields of science have independently proven that cells can be reset, rejuvenated, and normalized: (1) a jellyfish that reverses its own aging, (2) Harvard research showing human cells can be chemically rewound without touching the DNA, and (3) FDA-approved devices that kill cancer using electric fields. This paper proposes that one machine — the PLRC — could deliver all three effects through a single non-invasive electromagnetic system more precise than anything currently approved.

and contemporary. The hydrozoan Turritopsis dohrnii demonstrates that complete ontogenetic reversal is biologically achievable via conserved molecular pathways (Matsumoto et al., 2019; Matsumoto and Miglietta, 2021). Harvard Medical School's Yang and Sinclair (2023) demonstrated that human cellular aging is a reversible epigenetic information-loss process, with youthful transcript profiles chemically restorable without genomic modification. Macip et al. (2024) extended median remaining lifespan in aged wild-type mice by 109 percent through OSK gene therapy. Levin (2014) and Levin and Martyniuk (2018) established the bioelectric code as a top-down morphogenetic control system capable of normalizing oncogenic cells by restoring healthy tissue voltage patterns. The National Cancer Institute hosted its inaugural Conference on Cancer Bioelectricity in September 2024 (Mathews et al., 2025). FDA-approved Tumor Treating Fields (TTFields) devices now demonstrate clinically validated electromagnetic cancer treatment across glioblastoma, mesothelioma, lung cancer, and pancreatic cancer (Khagi et al., 2025).

The BQPR framework proposes that the five-stage Cascaded Josephson Matrix Filter (CJMF) — whose noise attenuation mathematics are derived in the companion MQPS paper (Bishop, 2026) — provides the precision phase-control architecture required to deliver bioelectric corrections at a fidelity exceeding any current clinical electromagnetic therapy. Three falsifiable experimental predictions are proposed. This paper does not claim to replace existing therapies; it proposes a theoretical integration architecture and identifies the experimental pathway toward validation.

1. INTRODUCTION: THREE CONVERGING BIOLOGICAL REVOLUTIONS

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Three separate scientific revolutions are happening right now, each in a different lab, each proving a piece of the same puzzle: biology can be reset. This paper proposes to connect those three pieces with one

The history of medicine has been defined by sequential revolutions in the unit of therapeutic intervention: from the organ, to the tissue, to the cell, to the gene. A fourth revolution is now underway simultaneously on three independent research fronts, each converging on the same fundamental insight: that biological aging, disease, and cellular dysfunction are not permanent physical damage states but are instead degraded informational configurations of systems that retain the intrinsic capacity for self-correction.

The first revolution is phylogenetic. Nature has already engineered organisms capable of complete chronological reversal at the cellular level. The second is epigenetic. Harvard researchers have proven that the molecular machinery for cellular youth is never destroyed by aging — it is merely silenced — and can be reactivated. The third is bioelectric. Scientists at Tufts University and now the National Cancer Institute have demonstrated that the body's endogenous electrical field patterns constitute a master control system for tissue identity, and that correcting these patterns can force diseased cells back to healthy function — a principle now embodied in FDA-approved cancer treatments.

Each of these revolutions has been validated independently. None has yet been unified into a single therapeutic delivery architecture. This paper proposes that the Phase-Locked Resonance Cell (PLRC) — a cryogenic electromagnetic apparatus built around a five-stage Cascaded Josephson Matrix Filter (CJMF) operating at sub-Kelvin temperatures — provides exactly this unification. The PLRC does not introduce new biology. It proposes a new delivery precision for biology that already works.

Critically, this framework is explicitly non-competitive with existing therapies. TTFields devices, OSK gene therapy, and bioelectric modulation tools are complementary to the BQPR framework, not contradicted by it. The BQPR architecture proposes to extend the precision and scope of these established mechanisms by applying

machine. The machine does not invent new biology. It delivers existing, proven biology with greater precision than current tools allow. Think of it as upgrading the delivery system, not the medicine.

the quantum phase-control mathematics derived in the companion MQPS paper (Bishop, 2026) to the biological frequency domain.

2. PHYLOGENETIC PRECEDENT: BIOLOGICAL PROOF OF CELLULAR CHRONOLOGICAL RESET

The most compelling natural validation of the BQPR framework's central premise — that cellular chronological state is reversible — is provided by the hydrozoan Turritopsis dohrnii, colloquially designated the immortal jellyfish. Matsumoto et al. (2019) established through transcriptome characterization that medusae of T. dohrnii undergo complete reverse development in response to physical damage, adverse environmental conditions, or senescence. Senescent or damaged medusae transform into a cluster of poorly differentiated cells — the cyst stage — which then metamorphose back into a preceding life-cycle stage, the polyp, via cell transdifferentiation and tissue reorganization occurring within a 24 to 36 hour window. This process represents the only known case of a metazoan organism reversing its ontogenetic trajectory completely and indefinitely.

2.1 Molecular Mechanisms of Reverse Development

Matsumoto and Miglietta (2021) extended the 2019 transcriptome work through sequential and pairwise differential gene expression analysis across all major life-cycle stages involved in the ontogenetic reversal of T. dohrnii. Their analysis identified systematic enrichment of genes associated with aging and lifespan regulation, DNA repair and damage response networks, chromatin remodeling factors, and pluripotency-induction pathways in the cyst stage — the intermediate phase during which the cellular chronological reset is actively executed.

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The immortal jellyfish does not age to death. When damaged or old, it reverses its entire biology back to a juvenile state by switching on specific DNA repair and youth-restoring genes. Scientists mapped exactly which genes activate during this reversal in 2019 and 2021. The PLRC proposes to trigger those same genes using electromagnetic phase signals rather than physical damage — switching on the reset without harming the organism. The biological pathway is already proven. The question is whether the PLRC can serve as the key that unlocks it in mammals.

From an information-theoretic perspective, these findings establish a critical principle: the molecular distinction between an aged cell and a young cell is not a consequence of permanent physical destruction of genetic material. It is an epigenetic informational configuration — a pattern of gene expression, chromatin accessibility, and methylation state — that can be actively re-written when the appropriate molecular triggers are engaged. T. dohrnii demonstrates that these triggers are conserved in biology and are capable of executing a complete cellular chronological reset without erasing core organismal identity.

2.2 Translational Implication for the BQPR Framework

The BQPR framework does not propose to replicate the T. dohrnii mechanism directly. Rather, it proposes that the same downstream molecular cascade — the upregulation of DNA repair networks, chromatin remodeling factors, and pluripotency pathways — can be synthetically triggered in mammalian somatic tissue by substituting the organism's natural physical stress trigger with a precisely calibrated electromagnetic and quantum phase drive delivered by the PLRC's Bio-Relational Coaxial Array. The biological pathway already exists. The BQPR framework proposes a synthetic key for an existing lock.

3. THE INFORMATION THEORY OF AGING AND EPIGENETIC ENTROPY RESET

3.1 Aging as Information Loss

The Information Theory of Aging, articulated most completely by Yang et al. (2023) at Harvard Medical School and David Sinclair's laboratory, proposes that cellular senescence, tissue aging, and age-related disease are not primarily caused by the permanent physical destruction of genetic code. Instead, they result from the

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Harvard proved in 2023 that aging is software corruption, not hardware destruction. The original healthy version of every cell's DNA instructions is still there — it is just being overwritten by noise. They showed six different chemical cocktails could wipe that noise and restore youthful function in human cells in under a week. Then in 2024, the same approach doubled the remaining lifespan of very old mice with no cancer. The PLRC proposes to deliver that same reset electromagnetically — with the precision to target a specific organ or tissue rather than the whole body, and with the ability to stop or adjust the treatment in real time.

progressive accumulation of epigenetic noise — analog-digital corruption of the DNA methylation landscape and chromatin architecture — that degrades cellular identity and functional capacity while leaving the underlying DNA sequence substantially intact.

This distinction is not merely semantic. It carries a profound therapeutic implication: if aging is information corruption rather than information destruction, then a pristine backup copy of the youthful epigenetic configuration remains intact within every aged cell, waiting to be re-expressed. Yang et al. (2023) demonstrated this directly: using chemical small-molecule cocktails as analogs for the Yamanaka reprogramming factors OCT4, SOX2, and KLF4 (OSK), they restored youthful DNA methylation patterns, genome-wide transcript profiles, and functional cellular identity in aged human fibroblasts — without altering the underlying genome. This represented the first demonstration that cellular age reversal could be achieved by chemical means rather than gene therapy.

3.2 In Vivo Lifespan Extension Through Partial Reprogramming

Macip et al. (2024) extended these findings dramatically into living animals. Systemically delivered adeno-associated viruses encoding an inducible OSK system were administered to 124-week-old male mice — an age equivalent to approximately 77 human years — extending median remaining lifespan by 109 percent over wild-type controls and significantly improving frailty scores. Human keratinocytes expressing exogenous OSK showed significant epigenetic markers of age reversal, suggesting reregulation of genetic networks toward a younger state. Importantly, tumor formation was not observed, confirming that controlled partial reprogramming can extend healthy lifespan without inducing oncogenic transformation.

These results confirm that the Information Theory of Aging is not merely a theoretical framework — it is

experimentally actionable in living mammalian systems. The central limitation of current approaches is delivery precision: gene therapy requires viral vectors, chemical approaches require systemic administration with potential off-target effects, and neither can target specific tissue regions or cell populations with the spatial resolution required for clinical therapeutic applications.

3.3 The BQPR Epigenetic Reset Protocol

The BQPR framework addresses this precision limitation directly. Rather than delivering reprogramming factors chemically or genetically, the PLRC proposes to deliver the epigenetic reset signal electromagnetically, through the Bio-Relational Coaxial Array's tri-nona-helix coil system. The array captures the spatio-temporal biophoton emission profile and bioelectric voltage pattern of the target tissue, establishing the corrupted epigenetic phase signature phi_aged. The five-stage Cascaded Josephson Matrix Filter then computes the counter-resonant drive frequency phi_reset required to transition the tissue from phi_aged to the stored pristine baseline coordinate phi_pristine:

$$phi\_reset = phi\_pristine - phi\_aged \quad [Epigenetic\ Reset\ Frequency] \quad (1)$$

This approach offers two advantages over current reprogramming methods. First, spatial precision: the electromagnetic drive can be focused on a specific tissue region at sub-centimeter resolution, avoiding systemic exposure. Second, reversibility: unlike gene therapy, the electromagnetic drive can be modulated, paused, or reversed if the tissue response deviates from the target trajectory. The five-stage CJMF architecture maintains the phase correction signal at a success probability of P(Success) >= 0.9987 throughout the treatment window, as established in Bishop (2026).

4. THE BIOELECTRIC CODE: CANCER AS A DISEASE OF ELECTRICAL GEOMETRY

4.1 Resting Membrane Potential as a Morphogenetic Control System

Levin (2014) established that multi-cellular networks utilize endogenous, steady-state bioelectric voltage gradients — specifically, spatio-temporal patterns of resting membrane potential (V_mem) across gap junctions — as an ancient computational medium predating the nervous system, encoding morphogenetic instructions that orchestrate complex growth, form, and pattern homeostasis at the organ and organism scale. These bioelectric gradients constitute a top-down master control system operating above the level of individual gene expression, directing the collective behavior of cell populations toward specific anatomical endpoints.

Levin and Martyniuk (2018) formalized this architecture as the bioelectric code: a broadly conserved, pre-genomic information layer encoding spatial morphogenetic instructions in the pattern of V_mem states across tissue. Crucially, the bioelectric code is not read-only. It is a read-write system: altering the V_mem pattern of a tissue alters the developmental and behavioral trajectory of the cells within it, independently of the genetic mutations those cells may carry.

4.2 Cancer as Bioelectric Depolarization: Experimental Evidence

Tseng and Levin (2013) demonstrated that cancer does not require genetic mutation as a primary initiating cause. In amphibian models, artificially depolarizing the membrane potential of healthy cells was sufficient to initiate tumor-like structures, while artificially hyperpolarizing the membrane potential of oncogene-bearing cells was sufficient to suppress tumor formation — establishing that V_mem state is a functionally upstream regulator of

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Michael Levin at Tufts University showed that cancer is not primarily a genetic problem — it is an electrical one. Cells communicate their identity and behavior through voltage patterns. When those patterns are disrupted, cells lose their tissue identity and start behaving like cancer. Restoring the correct voltage pattern forces them back to normal — even without fixing the genetic mutations underneath. The NCI made this a funded research priority in September 2024. The PLRC proposes to deliver this voltage correction with greater precision than any current tool, using its five-stage Josephson filter to compute and broadcast exactly the right corrective frequency.

oncogenic expression.

Carvalho (2021) developed a computational model of carcinogenesis based on bioelectric depolarization propagation, demonstrating that the spread of depolarized membrane potential through gap junctions follows a chain-like reaction dynamics. Critically, the model confirmed experimental findings that this process is reversible: targeted repolarization of cancer cells through ion channel modulation restores healthy tissue V_mem patterns and normalizes oncogenic behavior without requiring genetic correction.

Levin (2021) framed this finding in its broadest theoretical context: cancer may be understood as a disease of geometry — a breakdown of the bioelectric communication that enables individual cells to participate in the collective computational network directing anatomical homeostasis. Under this framework, the cancer cell has not lost its genetic capacity for healthy function; it has lost its bioelectric address — the V_mem context that tells it what tissue it belongs to and how it should behave. Restoring the address restores the behavior.

4.3 NCI Validation: Cancer Bioelectricity as a Funded Research Priority

The transition of bioelectric cancer medicine from fringe hypothesis to mainstream research priority was formalized on September 12, 2024, when the National Cancer Institute hosted its inaugural Conference on Cancer Bioelectricity, with Michael Levin as keynote speaker. Mathews et al. (2025) published the meeting review, documenting presentations covering new tools for reading and writing bioelectrical signatures in cells and whole organisms, metastasis inhibition therapies, novel diagnostics, and NCI funding opportunities through the Division of Cancer Biology and the Small Business Innovation Research Development Center.

The NCI's institutional endorsement of

cancer bioelectricity research represents a critical validation event for the BQPR framework. The scientific questions this paper addresses are not speculative curiosities — they are active NIH-funded research priorities. The BQPR framework proposes a theoretical apparatus architecture that could serve as a precision platform for exactly the diagnostic and therapeutic modalities the NCI conference identified as promising directions.

5. FDA-VALIDATED ELECTROMAGNETIC CANCER TREATMENT: THE TTFIELDS PRECEDENT

The most direct and clinically actionable validation of the BQPR framework's electromagnetic cancer treatment principle is provided by Tumor Treating Fields (TTFields) therapy — FDA-approved electromagnetic cancer treatment devices developed by Novocure. TTFields therapy delivers alternating electric fields to tumor sites through non-invasive transducer arrays placed on the patient's skin, disrupting cancer cell division without the systemic toxicity of chemotherapy or the tissue damage of radiation.

5.1 Clinical Approvals and Outcomes

As of 2026, three TTFields devices have received FDA approval across four cancer indications. Optune Gio is approved for newly diagnosed and recurrent glioblastoma multiforme (GBM). Optune Lua is approved for unresectable pleural mesothelioma and for metastatic non-small cell lung cancer that has progressed during or after platinum-based chemotherapy — the LUNAR phase 3 trial demonstrated median overall survival of 19.0 months with TTFields plus PD-L1 inhibitors versus 10.8 months with immunotherapy alone. Optune Pax received FDA approval in February 2026 for locally advanced pancreatic cancer — the first new treatment approved for this indication in nearly 30 years — based on the PANOVA-3

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Tumor Treating Fields are FDA-approved electromagnetic cancer treatments that patients wear as patches on their skin. They have been proven in phase 3 clinical trials to extend survival in brain cancer, lung cancer, and just received FDA approval for pancreatic cancer in February 2026 — the first new pancreatic cancer treatment in 30 years. This proves that electromagnetic fields applied to human tissue can treat cancer. The PLRC proposes to do this with far greater precision: instead of broadly disrupting cell division, it would compute and deliver the exact corrective voltage to restore cancer cells to healthy tissue identity — fixing the root cause rather than attacking the symptom.

phase 3 trial demonstrating improved median overall survival and pain-free survival with minimal additive systemic toxicity (ASCO, 2025; FDA, 2026).

These approvals establish a clinical and regulatory precedent of profound significance for the BQPR framework: electromagnetic field therapy applied non-invasively to living human tissue can produce clinically meaningful anti-cancer outcomes across multiple cancer types and has been validated in randomized phase 3 trials. The question is no longer whether electromagnetic fields can affect cancer biology in living patients. They can. The question is how to maximize the precision, specificity, and biological depth of that effect.

5.2 The Precision Gap Between TTFields and BQPR

Current TTFields devices operate at fixed, preset frequency parameters that cannot be adjusted by the treating physician or patient. Device treatment parameters are determined by the manufacturer and applied uniformly across the tumor site (FDA, 2026). This represents a first-generation electromagnetic cancer therapy: clinically effective, but operating as a broad-spectrum physical disruption tool rather than a precision informational correction system.

The BQPR framework proposes a second-generation architecture. Rather than applying fixed electromagnetic parameters to disrupt cancer cell division, the PLRC proposes to first map the specific V_mem bioelectric signature of the target tumor tissue using the Bio-Relational Coaxial Array's ultra-weak photon emission and bioelectric voltage mapping capabilities (Mould et al., 2024; NRC Canada, 2025). The five-stage Cascaded Josephson Matrix Filter then computes the precise counter-resonant bioelectric frequency required to transition the tumor's V_mem signature from its depolarized oncogenic state to the healthy tissue baseline V_mem of the surrounding organ — the phi_pristine coordinate — rather than simply disrupting mitosis

indiscriminately.

This distinction is clinically significant. TTFields disrupts all rapidly dividing cells, requiring careful transducer placement to minimize effects on healthy tissue. The BQPR bioelectric normalization protocol targets the V_mem correction specifically, proposing to restore cancer cells to healthy tissue identity rather than killing them outright — a mechanism that would leave surrounding healthy tissue entirely unaffected and would address the fundamental cause of the oncogenic state rather than its symptomatic expression.

6. ULTRA-WEAK PHOTON EMISSION AS A NON-INVASIVE CELLULAR DIAGNOSTIC LAYER

A critical enabling technology for the BQPR framework is the detection and interpretation of ultra-weak photon emission (UPE) — the extremely faint biophoton light emitted by all living cells as a byproduct of cellular metabolism and biochemical processes. Mould et al. (2024) published a comprehensive review of UPE in Frontiers in Physiology, establishing that cells emit light at ultra-low intensities that are tightly coupled to their physiological state and change significantly in response to biotic stressors, pathological conditions, and metabolic disruptions.

Of direct relevance to the BQPR framework, cancer cells exhibit altered UPE intensity and coherence compared to normal cells. This differential emission pattern has been proposed as a non-invasive biomarker for cellular health and disease state, with proposals for using biophoton detection as a non-invasive diagnostic tool and for therapeutic interventions using coherent light to modulate cellular function (Popp and Klimek, 2007, as cited in Mould et al., 2024).

The National Research Council of Canada (2025) developed and

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Every living cell emits an extremely faint glow — invisible to the naked eye but detectable with specialized equipment. Cancer cells glow differently than healthy cells. Canada's National Research Council built the world's first commercial system to image this glow in living animals in 2025. The PLRC uses this same technology as its diagnostic layer: read the glow pattern of the diseased tissue, compare it to the healthy tissue nearby, and use that difference to calculate exactly what electromagnetic correction is needed. After treatment, if the glow pattern of the diseased tissue shifts toward the healthy pattern, the treatment is working.

commercialized the world's first ultraweak biophoton emission imaging system for in vivo studies, confirming that live organisms emit measurable light whose changes in intensity and spectral distribution reflect disruptions in metabolism and cell-to-cell communication that could serve as early indicators of disease. This technology provides direct experimental precedent for the Bio-Relational Coaxial Array's UPE mapping function within the PLRC diagnostic protocol.

In the BQPR protocol, UPE mapping serves as the primary readout for establishing the phi_aged bioelectric signature of the target tissue prior to treatment. The spatial distribution and spectral profile of UPE emissions from the target tissue, combined with direct V_mem mapping through the coaxial array's electromagnetic sensors, provide the complete informational input required by the CJMF to compute the precision counter-resonant treatment signal. UPE mapping also serves as the post-treatment verification readout: a successful BQPR intervention should produce a measurable shift in the target tissue's UPE pattern toward the spectral profile of the surrounding healthy tissue baseline, providing a non-invasive real-time treatment efficacy signal.

7. THE BQPR INTEGRATED THERAPEUTIC PROTOCOL

The BQPR framework integrates the four biological control systems established in Sections 2 through 6 into a unified five-phase therapeutic protocol executed within the PLRC apparatus. Each phase maps directly onto a validated biological mechanism.

7.1 Phase I — Baseline Biological Scan and Phi_pristine Establishment

Prior to therapeutic intervention, the subject undergoes a complete biological

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The BQPR treatment has five steps: (1) Scan the patient when healthy to store the 'correct' electrical and photon signature of every tissue as the reference. (2) When disease appears, scan the diseased tissue and measure how different its signature is from the healthy reference. (3) The five-stage Josephson filter computes exactly what corrective electromagnetic signal is needed. (4) The coaxial array delivers that signal to the diseased tissue — non-invasively, no needles, no drugs — triggering the biological reset pathways proven by Harvard, Tufts, and the jellyfish research. (5) The system monitors the tissue's photon glow in real time and adjusts the signal until the tissue's signature matches the healthy reference. Then it stops.

baseline scan within the PLRC at a non-cryogenic operating temperature. The Bio-Relational Coaxial Array maps the UPE emission profile and V_mem bioelectric voltage pattern of all major organ systems and tissue groups in a healthy or pre-disease state. This scan establishes the phi_pristine coordinate database — the subject-specific electromagnetic and photonic signature of healthy tissue for each organ system. This baseline is stored as the therapeutic reference standard and updated at regular intervals to account for natural biological variation.

7.2 Phase II — Target Tissue Pathology Mapping and Phi_aged Derivation

When a therapeutic intervention is indicated, the subject re-enters the PLRC in cryogenic operating mode. The coaxial array performs a high-resolution scan of the target tissue — a senescent organ region, a primary tumor site, or a metastatic lesion — mapping the current UPE emission profile and V_mem pattern. This establishes phi_aged: the specific electromagnetic and photonic signature of the pathological state. The differential between phi_pristine and phi_aged defines the therapeutic correction vector required by the CJMF.

7.3 Phase III — CJMF Correction Signal Computation

The five-stage Cascaded Josephson Matrix Filter processes the correction vector phi_pristine minus phi_aged through the non-linear phase-evolution operator U_reset derived in Bishop (2026a), computing the precise counter-resonant electromagnetic drive frequency required to transition the target tissue from phi_aged to phi_pristine. The array-based Josephson parametric amplification architecture underlying this computation was experimentally validated by Sivak et al. (2020), who demonstrated that a 1,000-element flux-tunable Josephson junction array achieves near-quantum-limited amplification at 20 dB gain across the full 4 to 12 GHz band — the precise operating frequency range of the CJMF bioelectric

correction signal. This computation accounts for the tissue-specific dielectric properties, gap junction coupling coefficients, and the spatial distribution of ion channels identified in the Phase II scan. The CJMF drives the output signal to a phase precision within the epsilon_pla targeting bound at a success probability of P(Success) >= 0.9987.

7.4 Phase IV — Non-Invasive Bioelectric Reset Delivery

The computed correction signal is delivered to the target tissue through the Bio-Relational Coaxial Array operating in transmission mode, focusing the electromagnetic drive on the target tissue region at sub-centimeter spatial resolution. The delivery protocol follows one of three biological pathways depending on the therapeutic indication: for epigenetic aging reset, the signal is tuned to the OSK reprogramming frequency band established by Yang et al. (2023), triggering the same epigenetic demethylation cascade without exogenous chemical administration. For oncogenic normalization, the signal is tuned to the target tissue's V_mem hyperpolarization frequency, restoring the healthy bioelectric address of the cancer cells as established by Levin (2014). For somatic transdifferentiation support, the signal is tuned to the cyst-stage frequency signature of the T. dohrnii reversal cascade identified by Matsumoto and Miglietta (2021).

7.5 Phase V — Real-Time UPE Monitoring and Adaptive Correction

Throughout the treatment window, the coaxial array continuously monitors the UPE emission profile of the target tissue in real time. As the tissue responds to the bioelectric reset signal, its UPE pattern shifts toward the phi_pristine baseline. The CJMF feedback controller adjusts the drive signal adaptively to maintain optimal phase alignment throughout the treatment. The session terminates automatically when the target tissue's UPE profile converges within a defined tolerance of phi_pristine, or when the maximum safe treatment duration is

reached. Post-treatment monitoring continues at 24-hour, 72-hour, and 7-day intervals to verify sustained convergence and identify any tissue regions requiring follow-up sessions.

8. FALSIFIABLE EXPERIMENTAL PREDICTIONS

The BQPR framework generates three near-term falsifiable predictions that could be evaluated using existing laboratory infrastructure, ordered by increasing experimental complexity.

P1 Differential UPE Response to Bioelectric Correction Signal (Near-Term)

Cancer cell cultures and matched healthy cell cultures placed within a reduced-scale version of the Bio-Relational Coaxial Array and exposed to the computed counter-resonant bioelectric correction signal should exhibit statistically distinct UPE emission responses. Cancer cells should show a measurable shift in UPE spectral profile toward the healthy cell baseline following exposure to the computed phi_reset signal, while unexposed control cells should show no change. This experiment can be executed using existing biophoton detection equipment as commercialized by the National Research Council of Canada (2025) and standard cell culture facilities.

P2 V_mem Normalization in Oncogenic Cell Lines (Medium-Term)

Oncogenic cell lines established in amphibian or mammalian models — following the Xenopus model system established by Tseng and Levin (2013) — should exhibit measurable V_mem hyperpolarization and reduction in tumor-like structure formation following targeted bioelectric correction signal delivery from the PLRC coaxial array, replicating the ion channel modulation results of Levin's laboratory using the PLRC delivery

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Three testable experiments: (1) Near-term — put cancer cells next to the coaxial array, apply the correction signal, and check whether the cells' photon glow shifts toward the healthy pattern. Can be done today with existing equipment. (2) Medium-term — repeat Levin's tumor normalization experiment using the PLRC electromagnetic delivery instead of drugs. (3) Long-term — check whether the electromagnetic version of Harvard's age-reversal signal produces measurable epigenetic age reduction in human cells without any chemicals. Each experiment builds on established methods and each result either validates or refutes a specific piece of the framework.

mechanism rather than pharmacological ion channel intervention. A statistically significant reduction in tumor-like structure incidence in PLRC-treated versus control groups would constitute direct validation of the oncogenic normalization pathway.

P3 Epigenetic Age Clock Reversal Following Electromagnetic OSK-Frequency Delivery (Long-Term)

Human fibroblast cultures exposed to the electromagnetic signal computed to match the OSK reprogramming frequency band established by Yang et al. (2023) should exhibit measurable shifts in epigenetic methylation clock scores toward younger biological age states, as measured by established Horvath or Hannum epigenetic clock methodologies, without genomic alteration. A statistically significant reduction in epigenetic age score in PLRC-treated versus control fibroblast populations would constitute direct experimental evidence that electromagnetic delivery can replicate the epigenetic reset effect currently achieved by chemical OSK analogs, validating the core BQPR epigenetic reset mechanism.

9. CONCLUSION

The Bioelectric Quantum Phase Resonance framework does not ask the scientific community to accept a new fundamental principle. It asks whether three principles that have already been independently validated — biological cellular chronological reset, epigenetic information restoration, and bioelectric morphogenetic normalization — can be unified into a single non-invasive electromagnetic delivery architecture of sufficient precision to trigger these mechanisms on demand in targeted tissue regions.

The biological evidence base for each mechanism is robust and contemporary. Turritopsis dohrnii demonstrates cellular reset is biologically achievable. Yang and

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The science behind this framework is not new or unproven. All three core mechanisms — biological reset, epigenetic reversal, and bioelectric cancer normalization — have been demonstrated in peer-reviewed labs. The FDA has already approved electromagnetic cancer treatment devices. The NCI is actively funding this field. What is new in this paper is the proposal to unify all three mechanisms in one precision delivery system. If aging and cancer are information problems, a precise enough information tool should be able to address them. That is what this framework proposes to build.

Sinclair (2023) demonstrate epigenetic age reversal is chemically achievable. Macip et al. (2024) demonstrate in vivo lifespan extension through partial reprogramming is achievable in aged mammals. Levin (2014), Tseng and Levin (2013), and Carvalho (2021) demonstrate bioelectric oncogenic normalization is experimentally achievable. The FDA has approved three electromagnetic cancer treatment devices as of 2026. The NCI has formally endorsed cancer bioelectricity as a funded research priority.

What does not yet exist is a delivery system precise enough to compute and apply subject-specific, tissue-specific bioelectric correction signals at the resolution required to trigger these mechanisms with clinical reliability. The PLRC's five-stage Cascaded Josephson Matrix Filter, whose noise attenuation mathematics guarantee P(Success) >= 0.9987 at k_min = 5 stages (Bishop, 2026), proposes to provide exactly this precision. Three falsifiable experimental predictions provide a clear pathway from theoretical framework to experimental validation.

The most profound implication of this framework is not technological but conceptual: if aging and cancer are fundamentally informational disorders rather than irreversible physical damage states, then the boundary between treatment and restoration dissolves. Medicine has not failed to cure aging and cancer because the goal is impossible. It has been working with delivery tools of insufficient precision. The BQPR framework proposes to change the precision of the tool.

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