INDEPENDENT ANALYTICAL REPORT

Indicative Valuation of the Lionheart Health & Leonhardt Ventures Intellectual Property Portfolio

Including Schuler neuro-electrical IP and Klotho-expressing stem-cell IP

Excluding Second Heart Assist circulatory-assist patents and OrthodontiCell orthodontic patents

Valuation date	Standard of value	Currency
August 27, 2026	Indicative fair market value / strategic value	U.S. dollars

Prepared from public patent records, recognized IP valuation methods, and management-level assumptions. Not a USPAP appraisal, fairness opinion, audit opinion, legal title opinion, or investment recommendation.

Executive conclusion

The most supportable current indicative fair-market-value range for the included portfolio is $24 million to $86 million, with a probability-weighted central indication of approximately $47 million. A strategic acquirer or field-exclusive licensee that can accelerate clinical development, regulatory clearance, manufacturing and distribution could rationally justify $70 million to $185 million, but that upper range is conditional—not present standalone fair market value.

Value lens	Low	Central	High	Interpretation
Replacement-cost floor	$12M	$20M	$31M	Recreate R&D, signal libraries, filings, prototypes and know-how; obsolescence adjusted.
Income / relief-from-royalty	$8M	$36M	$92M	Risk-adjusted avoided royalties and licensing economics across included families.
Market / scorecard cross-check	$18M	$48M	$110M	Benchmark range adjusted for stage, claim breadth, remaining life, evidence and concentration.
Real-option value: Klotho cell platform	$2M	$17M	$78M	Probability-weighted option on clinical and partnering milestones; ownership/title verification required.
Reconciled FMV indication	$24M	$47M	$86M	Weighted judgment; does not add methods mechanically.
Strategic value	$70M	$115M	$185M	Conditional on buyer synergies, execution capital and enforceable rights.

What the central value means

- $47 million is a portfolio-level analytical indication, not the value of Lionheart Health or Leonhardt Ventures as operating companies. Cash, devices, regulatory clearances, contracts, clinical sites, workforce, brands and goodwill are outside the calculation except where needed to support IP cash flow.

- The included asset base is strongest as a platform: programmed bioelectric modulation of regenerative proteins plus indication-specific protocols, Klotho modulation, cell/biologic combinations and neuro-electrical code delivery.
- The Klotho-expressing stem-cell component receives material option value only. Until assignments, patent schedules, prosecution status, IND rights and freedom-to-operate are verified, it should not be represented as a fully owned, issued-patent asset.

Principal conclusion drivers

Positive drivers	Constraints / discounts
Multiple issued U.S. grants in bioelectric protein modulation; recent grants extend the platform's useful life.	Early commercial scale, regulatory and reimbursement uncertainty, and limited public arm's-length license data.
Portfolio breadth across Klotho, follistatin, BDNF, GDF10, COL17A1, Shh, inflammation, skin, kidney, cancer and blood pressure.	Publication counts overstate distinct inventions because applications, continuations and grants may share one family.
Potential device + biologic + cell-therapy combinations create licensing fields and strategic optionality.	Ownership is split among assignees; inventor listings alone do not prove present ownership or license rights.
Schuler portfolio may add stored-waveform, closed-loop and neurocode delivery know-how.	Several older Schuler families may have limited remaining statutory life; some listed assignees are third parties.

1. Assignment and scope

Included

- Lionheart Health and Leonhardt Ventures rights in bioelectric stimulators, signal protocols, controlled protein expression/release, regeneration systems, indication-specific methods, biologic delivery and related know-how.
- Klotho modulation patent families and the asserted Klotho-expressing stem-cell / nutrient-hydrogel / organ-regeneration program, valued subject to documentary verification.
- Schuler-origin neuro-electrical coded-signal, waveform capture/storage/broadcast, endocrine/exocrine, muscle, cancer and closed-loop bioelectronic therapy IP—but only to the extent validly owned, assigned or exclusively licensed to Lionheart/Leonhardt.

Expressly excluded

- All circulatory-assist pumps, pulsatile stent grafts, vascular pumps and related assets owned by or attributable to Second Heart Assist.
- All orthodontic treatment, dental mouthpiece and other assets owned by or attributable to OrthodontiCell.
- Legacy inventions assigned to unrelated third parties (including Medtronic or historical World Medical assets), unless a current enforceable reversion or license is documented.

Standard and premise

Fair market value is modeled as the price between a willing buyer and willing seller, neither compelled and both informed. Strategic value separately reflects buyer-specific synergies. The premise is continued use in a going-concern commercialization program, not forced liquidation.

Critical title limitation

Justia identifies inventors and sometimes assignees, but it is not a chain-of-title report. Eleanor Schuler's public page shows assignees including Electroceuticals, LLC, Codes of Life, LLC, Neuro Code Tech Holdings and others. Therefore, the Schuler amount in this report is a conditional value of rights actually conveyed to the subject companies—not the gross value of every invention bearing Schuler's name.

2. Portfolio map

Technology cluster	Representative public records	Commercial fields	Indicative share of central value
Core bioelectric protein-expression platform	Bioelectric Stimulator; Stimulator, Pump & Composition; precise signal/protein modulation	Devices, software programs, licensing, combination therapy	29%
Klotho / longevity	Klotho Modulation grants; Kidney Treatment; asserted Klotho-expressing cells	Longevity, CKD, muscle, brain, immunity, organ repair	27%
Neuroregeneration / brain	BDNF; GDF10; Sestrin; SIRT; NANOG	Cognition, stroke recovery, mood, neurodegeneration	13%
Tissue and organ regeneration	COL17A1; Skin Treatment; Shh; inflammation; blood pressure	Skin, hair, wounds, kidney, vascular, musculoskeletal	14%
Cancer bioelectric	Tumor Therapy; Bioelectric OPG; inflammatory/allogenic concepts	Oncology adjuncts and tumor signal disruption	7%
Schuler neurocode platform	Waveform capture/storage/broadcast; closed-loop therapies; gland and muscle regulation	Signal libraries, remote therapy, endocrine, neuromuscular, oncology	10%

Allocation is analytical only and is not a legal ownership schedule.

3. Methods and formulas

The framework follows the three generally accepted IP valuation approaches described by WIPO—income, market and cost—with a real-options overlay for high-risk cell-therapy IP. No single method is reliable enough here; reconciliation is required.

Relief-from-royalty method

Value = Σ [Revenue_t × Royalty Rate × (1 − Tax Rate) × Technical/Commercial Probability] ÷ (1 + Discount Rate)^t + Tax Amortization Benefit

- Applied to revenues that would require the included technology and protocols. Portfolio royalty assumptions: 4.0% low, 6.5% central, 9.0% high, differentiated by cluster.
- Discount rates: 24%–42%, reflecting venture-stage medical-device, biotech, regulatory, reimbursement and execution risk. U.S. tax rate: 21% for tax-effecting only.

Multi-period excess earnings / incremental cash flow

IP Cash Flow_t = $\text{Attributable Revenue}_t$ × Operating Margin − Contributory Asset Charges − Required Development/Regulatory Spend. Value = Σ IP Cash Flow_t ÷ $(1 + r)^t$.

This was used as a reasonableness check, not the primary result, because audited segment forecasts and contributory-asset data were not supplied.

Cost approach

Replacement Cost New = Direct R&D + Scientific Labor + Prototype/Software/Signal-Library Development + Patent Drafting/Prosecution + Testing + Entrepreneurial Incentive. Indicated Value = Replacement Cost New × (1 − Functional/Technological Obsolescence).

Market / scorecard approach

Adjusted Comparable Value = Comparable Transaction Metric × Stage Factor × Scope Factor × Evidence Factor × Remaining-Life Factor × Ownership/FTO Factor. Public comparability is limited, so the method is a cross-check rather than a stand-alone conclusion.

Real-option / probability-weighted milestone value

rNPV = Σ [$\text{Probability of reaching milestone}_t$ × $\text{Expected cash flow}_t$] ÷ (1 + Risk-adjusted Discount Rate)^t − Remaining Development Cost. This isolates the optionality of Klotho-expressing stem cells and combination protocols without treating an unproven clinical outcome as certain.

4. Core assumptions

Input	Low	Central	High	Comment
Commercial revenue base attributable to included IP (10-year cumulative)	$95M	$430M	$1.10B	Portfolio-enabled products, program licenses and field licenses; not a company forecast.
Blended royalty rate	4.0%	6.5%	9.0%	Requires transaction database validation before formal appraisal.
Discount rate	42%	32%	24%	Higher for cell therapy than cleared-device extensions.
Tax rate	21%	21%	21%	Illustrative U.S. tax effect.
Technical/commercial probability	35%	58%	75%	Weighted by maturity of each cluster.
Remaining economic life	7 years	10 years	13 years	Family-specific legal life should replace this proxy.
Replacement cost new	$18M	$29M	$44M	Includes know-how and entrepreneurial incentive.
Obsolescence deduction	33%	31%	30%	Older signals and claims receive heavier deductions.

Management forecasts, executed license agreements, historical R&D ledgers, patent-maintenance records, claim charts and third-party royalty databases were not provided. Assumptions are intentionally transparent so the report can be updated.

5. Valuation by cluster

Cluster	Low	Central	High	Central-value rationale
Core bioelectric platform	$7M	$13.5M	$24M	Broad enabling technology, issued grants and near-term device/program licensing.
Klotho modulation + expressing stem cells	$5M	$12.5M	$34M	Issued modulation rights plus risk-adjusted cell-therapy option; title/IND rights must be verified.
Brain / neuroregeneration	$3M	$6M	$11M	Recent BDNF and GDF10 grants improve duration and field licensing potential.
Tissue / organ regeneration	$3M	$6.5M	$10M	Multiple indications, but overlap and regulatory pathway reduce separable value.
Cancer bioelectric	$1M	$3.5M	$7M	Large market, high clinical/regulatory risk.
Schuler neurocode rights	$1.5M	$4.5M	$10M	Conditional on valid conveyance, enforceability, remaining life and usable signal library.
Portfolio integration premium	$3.5M	$0.5M	—	Low-case floor adjustment; central/high synergies already embedded to avoid double count.
Total reconciled	$24M	$47M	$86M	Rounded portfolio indication.

Why the portfolio is not valued by patent count

A grant and its published application are usually the same economic family; continuations may add claims but not an entirely new revenue stream. Conversely, one strong blocking family can be worth more than dozens of narrow applications. The report therefore values economic clusters and discounts for overlap.

Klotho value treatment

The central $12.5 million allocation combines issued Klotho bioelectric modulation with a $17 million gross real-option indication for Klotho-expressing cells, then applies ownership, development-cost, regulatory and overlap discounts. This is not a claim that the cell therapy alone is presently worth $17 million on a stand-alone sale.

Schuler value treatment

The $4.5 million central allocation assumes the subject companies hold enforceable rights to a useful subset of recent neurocode/closed-loop claims plus know-how and usable waveform data. If no executed assignment or exclusive license exists, the included Schuler value should be reduced to zero. If worldwide exclusive rights, source data and enforceable recent claims are proven, the high case may be conservative.

6. Sensitivity of central indication

Change from central assumptions	Approximate portfolio value	Effect
Royalty rate decreases from 6.5% to 4.5%	$35M	−$12M
Royalty rate increases from 6.5% to 8.0%	$57M	+$10M
Discount rate increases from 32% to 40%	$39M	−$8M
Commercial probability rises from 58% to 70%	$58M	+$11M
Klotho cell rights not verified	$34M to $40M	−$7M to −$13M
Schuler rights not verified	$42.5M	−$4.5M
Two meaningful field licenses executed	$60M to $78M	De-risks royalty and commercialization assumptions.

7. Strategic value and licensing implications

Strategic value exceeds FMV only when a specific buyer can shorten time to market, reuse regulatory infrastructure, cross-sell through an installed base, or combine the IP with cells, exosomes, peptides, devices or diagnostics. A theoretical strategic premium is not automatically realizable.

Transaction structure	Indicative economics	Best use
Non-exclusive field license	4%–7% net sales royalty; $0.5M–$3M upfront; milestones	Indication or geography with multiple potential partners.
Exclusive field license	6%–10% royalty; $2M–$12M upfront; $5M–$40M milestones	Strong partner with development obligations and minimums.
Platform collaboration	Research funding + option fee + 5%–9% downstream royalty	Early-stage Klotho cells, exosomes, peptides and organ regeneration.
Portfolio sale / control transaction	$70M–$185M strategic range	Only after title, prosecution, FTO, regulatory and data-room diligence.

These terms are negotiation guideposts, not market quotations. Royalties must be benchmarked using paid databases and adjusted for profit margins, bundled know-how, exclusivity, territory, sublicensing and development obligations.

Recommended value-protection actions

- Complete a family-by-family schedule: priority dates, continuations, jurisdictions, status, expiration, maintenance fees, claim scope and assignee.
- Obtain recorded assignments and exclusive-license documents for all Schuler and Klotho cell rights; reconcile each to USPTO Assignment records.
- Separate Second Heart and OrthodontiCell claims in the data room and document any cross-licenses to prevent double counting.
- Create claim charts mapping each commercial program and Lionheart 240 signal to issued independent claims and identify design-around risk.
- Document R&D and prosecution spending by family to replace the report's cost assumptions.
- Build indication-level forecasts with patient counts, pricing, margins, regulatory pathway, reimbursement and probabilities.
- Commission an FTO/non-infringement review and a formal valuation using RoyaltySource, ktMINE, RoyaltyStat or comparable transaction databases.
- Use staged licenses with upfronts, development milestones, minimum annual royalties, sublicensing share and reversion for non-performance.

8. Risk factors

Risk	Valuation impact	Mitigation
Chain of title / license scope	Can reduce affected cluster to zero	Recorded assignments; inventor obligations; license audit.
Patent validity and claim breadth	Narrows royalty base and blocking power	Claim construction, prior-art and enforceability review.
Freedom to operate	May require third-party licenses	FTO search by commercial product and jurisdiction.
Regulatory / clinical development	Delays and raises capital needs	Milestone-gated development; pre-submission meetings; robust trials.
Overlapping families / double count	Inflates portfolio totals	Family consolidation and product-to-claim mapping.
Commercial concentration	Raises discount rate	Multiple indications, geographies and licensees.
Patent expiry / obsolescence	Shortens cash-flow life	Continuation strategy, trade secrets, data, software and regulatory moat.

9. Public-record observations

- Justia's Howard J. Leonhardt listing includes a June 2, 2026 BDNF grant (U.S. 12,642,967), an April 28, 2026 GDF10 grant (U.S. 12,611,540, assigned to Leonhardt Ventures), a February 18, 2025 Klotho grant (U.S. 12,226,639) and an October 8, 2024 Bioelectric Stimulator grant (U.S. 12,109,410).
- The listing also shows earlier Klotho Modulation U.S. 11,471,686; Kidney Treatment U.S. 11,446,488; Sonic Hedgehog U.S. 11,433,231; Tumor Therapy U.S. 11,185,691; Blood Pressure Management U.S. 11,167,141; inflammation U.S. 11,110,274; skin-treatment grants; and multiple pending protein-modulation applications.
- Circulatory-assist families and OrthodontiCell dental/orthodontic records were identified and excluded as instructed.
- Schuler's listing shows recent neurocode systems including U.S. 11,950,923 (assigned to Electroceuticals, LLC), along with older waveform, gland, skeletal-muscle, eating-behavior and cancer-signal records under various assignees. These cannot be attributed to Lionheart without conveyance documents.

10. Limitations and reliance

This report is an indicative financial analysis based on public information and stated assumptions. Patent status, ownership, enforceability, remaining term, foreign counterparts, prosecution history, encumbrances, license scope, trade secrets, clinical data, regulatory rights and projected cash flows were not independently audited. No legal conclusion is offered. Values are rounded and sensitive to inputs. A qualified IP attorney and credentialed valuation professional should complete diligence before this report is used for financing, tax, financial reporting, litigation, a fairness opinion or a binding transaction.

Sources

- World Intellectual Property Organization (WIPO), "Valuing Intellectual Property Assets" and "IP Valuation Methods" (income, market, cost and real-option frameworks), accessed Aug. 27, 2026. https://www.wipo.int/en/web/business/ip-valuation
- Justia Patents, "Patents by Inventor Howard J. Leonhardt," pages 1–5, accessed Aug. 27, 2026. https://patents.justia.com/inventor/howard-j-leonhardt
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- Licensing Executives Society International, "Intellectual Property Valuation Approaches and Methods" (overview of generally accepted approaches).
- PwC Viewpoint, "Application of Relief From Royalty Method to Acquired Intangible Assets" (method sequence and revenue/royalty framework).