G1Brain

From Nobel Prize-winning battery science to AI-driven discovery

Experimental evidence. Scientific reasoning. Scale-up and failure learning.

Group1's next-generation potassium-ion battery platform traces its scientific origins to the pioneering research of **John B. Goodenough, co-inventor of the lithium-ion battery and recipient of the 2019 Nobel Prize in Chemistry.** Over four years of development, Group1 has assembled what it believes to be **the world's largest potassium-ion battery dataset**, spanning materials synthesis at multiple scales, electrolyte formulation, process development, characterization, cell engineering, and empirical successes and failures. G1Brain brings this experimental record together with **recorded scientific reasoning and operational context**: what was made, how it performed, how results were interpreted, and why subsequent experiments were chosen.

~4 years
Experimental R&D and weekly reporting

2 L ⟶ 50 L
Existing lab-to-pilot scale-up record

~600
Technical reports and presentations preserving **semantic context**

25+
Contributors across Group1's history*

*Cumulative employees, interns, contractors and advisers identified in Gusto and Slack. Inventory figures remain subject to validation.

One company record, three potential uses

Scientific models

Materials, processing, characterization and cell outcomes. Evaluate prediction across scale, formulation and design.

Scientific reasoning & agents

Recorded semantic context: hypotheses, interpretations, failure diagnoses and reasons for the next experiment.

Enterprise-workflow evaluation

Purchasing, suppliers, accounting, coordination and system handoffs provide operating context.

From records to the sequence of work

Purchase materials → **Run experiments at multiple scales** → **Measure, interpret & diagnose** → **Discuss, learn & adjust**

Illustrative workflow; mapping does not imply every underlying record has already been joined.

An experimental foundation for scientific AI

This longitudinal record could complement computational materials discovery by helping evaluate how chemistry, processing, scale and cell engineering translate into measured outcomes. Record linkage, training suitability and generalization beyond this battery platform remain to be evaluated.

Alex Girau | CEO and Co-Founder | alex@group1.ai

Inside G1Brain

Three complementary uses of one company record

The inventory spans experiments, interpretation and operations. Grouping indicates potential use, not validated AI capability; records may support more than one use.

Content	Representative records	Sources / context
01 SCIENTIFIC MODELS		
Structured science	**~8,600 indexed experiments/recipes** across **54 R&D projects**. **~19M recipe-output entries**, including nulls.* Materials and electrolyte formulations, multi-scale synthesis, process development and cell performance.	Uncountable; supporting Box records
Raw data & characterization	Instrument files, images, XRD, spectra and thermal data; materials/electrolyte characterization; **coin, pouch and 18650** electrochemical testing, cycling and degradation.	Box; Uncountable metadata
Cell design & engineering know-how	**Coin, pouch and 18650** design know-how: varying cell designs, electrode builds, component selection and build records.	Cell-build records; reports; technical discussions
Failures & iteration	Unsuccessful experiments, underperforming cells, diagnostic observations, corrective actions and changes to formulations or protocols.	Experimental records; reports and discussions
02 SCIENTIFIC REASONING & AGENTS		
Reports & semantic context	**~600 technical reports and presentations** preserve methods, results, experimental rationale, interpretations, failure diagnoses and next-step decisions.	Box; supporting raw data
Scientific reference library	**500+ scientific and technical references** supporting KIB R&D: materials, electrolytes, characterization and cell engineering.	Zotero; Box
Conversations & coordination	**~65,000 Slack messages** covering technical and operational discussions, troubleshooting and coordination, plus email and supplier correspondence.	Slack; email
03 ENTERPRISE-WORKFLOW EVALUATION		
Finance & purchasing	**7,950 Brex expense entries**, **331 Bill Pay records** and **~6,500 QuickBooks accounting records**; invoices, receipts and procurement context.	Brex; QuickBooks; supporting documents
Operations & development	Project plans, schedules, resource allocation, equipment acquisition and management reporting.	Box; Slack; email; business systems
G1Brain workflow & data mapping	Architecture and process-flow maps of scientific and operational workflows, source systems, handoffs, dependencies and supporting evidence.	G1Brain system map; Box: **5+ TB account storage****
Methods & automation	SOPs, test and analysis methods, scripts, data mappings, prompts, runbooks and documented agentic workflows.	G1Brain assets; Box; workflow sources

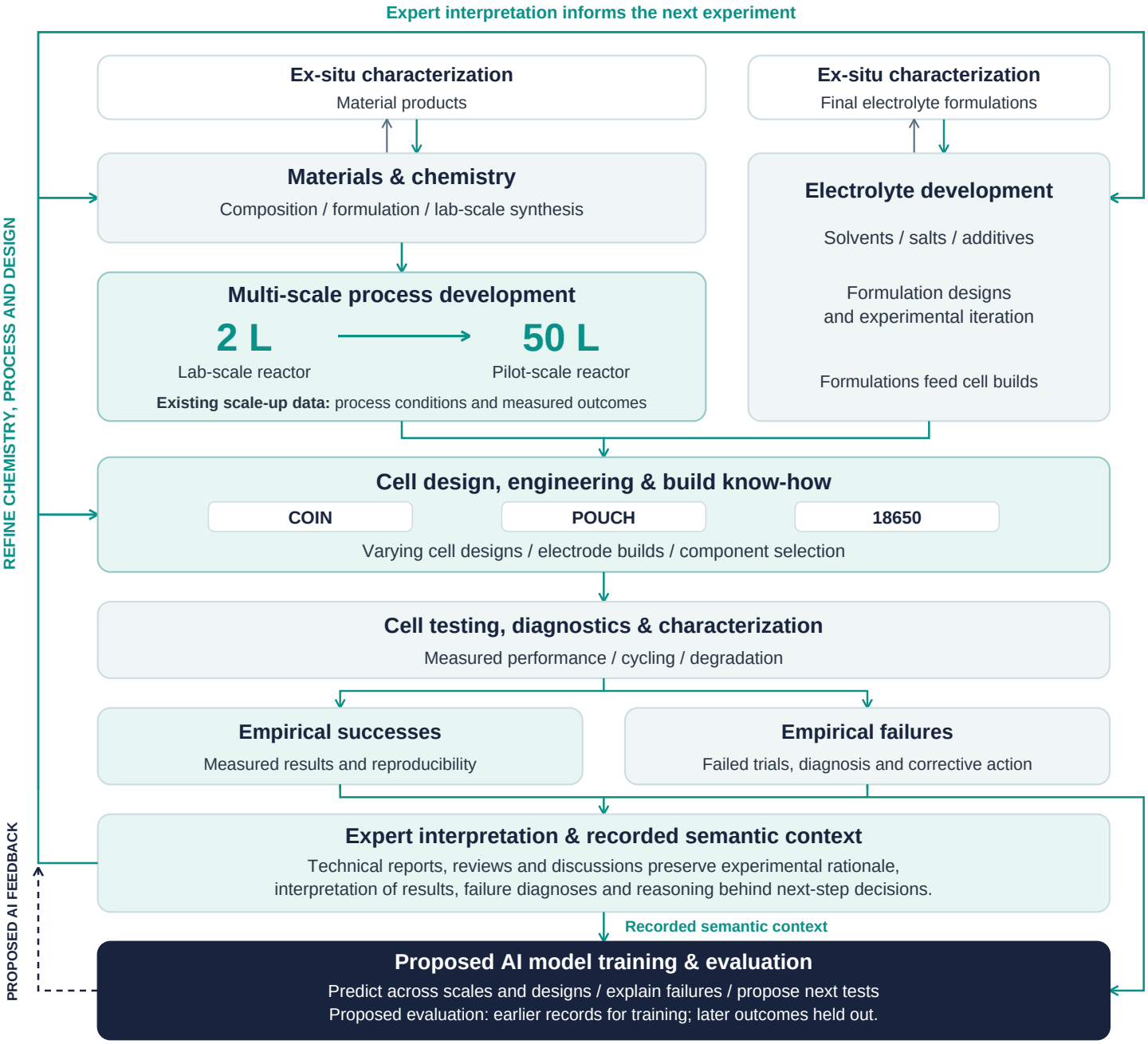
*Index counts are not verified completed experiments or measurements. Recipes may include templates; output entries include nulls. **Box account storage is not unique dataset size. Slack/QuickBooks counts are estimates; Brex export spans June 2022-Oct 2026. Records may overlap.

Excluded: legal documents and legal correspondence. Group1 assets only; patent rights and previous-company data are outside this package. Scope is subject to transfer rights, confidentiality and agreed de-identification. Counts, duplication, record-level linkage, export readiness and workflow portability remain to be validated.

A Data-Driven AI Flywheel

Four years of experimental learning. A foundation for AI-driven discovery.

G1Brain preserves **four years of experimental evidence and recorded semantic context**: scientific questions, development rationale, interpretation of successes and failures, and reasoning behind subsequent experiments. This context explains what happened, what it meant and why the next test was chosen - a foundation for a proposed **Data-Driven AI Flywheel** learning from both measured outcomes and documented scientific reasoning.



The advantage is the accumulated experimental history

Recreating a comparable foundation requires repeated synthesis, scale-up, electrolyte iteration, cell builds and cycling - with unsuccessful approaches, recorded interpretation and next-step decisions preserved alongside the results.

Capability only: 12 × 250 mL microchannel reactors for planned high-throughput scale-down synthesis; **no experimental data yet.**

Conceptual architecture, not a verified joined training set. Record linkage, rights, confidentiality and task-specific validation remain required.