The Compound Chronicle
Field Guide

From certificate to bench: how to verify a batch, prepare a solution, run the numbers and store the material — without the expensive mistakes.

00 Read this first

This is a methods reference, not a catalogue of recommendations. It describes how to evaluate, prepare and store research materials — it does not tell you what to use, how much of anything to prepare, or what any compound will do.

Everything here is written for **laboratory and in vitro research**. Nothing in this guide describes or implies human or animal use, and nothing in it is medical advice, dosing guidance, or a statement of safety for any purpose outside a laboratory.

Compound Chronicle is an independent editorial publication. We do not sell the materials discussed on this site, we do not accept payment for coverage, and we separate what a study shows from what a headline claims. Where the evidence is thin, we say so. That habit is the whole point of the guide.

> THE ONE RULE THAT CARRIES THE REST
>
> A certificate is evidence about a batch, not about a compound. Before any number in this guide means anything, the material in your hand has to be the material the document describes.

01 Read the evidence first

Most confusion about research compounds is not a disagreement about facts. It is a disagreement about what kind of fact is being discussed. A cell study, an animal study and a controlled trial can all be real, well-run and correctly reported — and still support completely different sentences.

Every article we publish is tagged with the tier of evidence it rests on. The tier is not a quality score; it is a statement about what the result is allowed to mean.

TIER	WHAT IT CAN SUPPORT	WHAT IT CANNOT
Cellular / in vitro	A mechanism is possible; a direction of effect in a defined system.	Anything about a whole organism. Concentration in a dish is not concentration anywhere else.
Animal	That an effect reproduces in a living system, with amount and timing under control.	Human outcomes, cross-species amount translation, or long-horizon safety.
Observational human	Patterns worth testing; associations that generate hypotheses.	Causation. Selection and recall bias are always live alternatives.
Controlled human	A causal claim for the population, endpoints and duration actually tested.	Anything outside that population, amount range, or follow-up window.
Testing / data	Facts about a specific batch: identity, purity, quantity, measured properties.	Any claim about what the compound does. A certificate is not an effect.

Three habits that survive any headline

- **Ask what was measured, not what was concluded.** An abstract's last sentence is a claim; the results section is the evidence.
- **Match the model to the question.** A cell line answers questions about cells. It does not answer questions about organisms, and the gap is not a formality.
- **Treat a mechanism as a hypothesis.** "It binds this receptor" explains how something could work. It is not a demonstration that it does anything useful.

When a claim arrives without a tier, that is information too: it usually means nobody has checked which kind of evidence it came from.

02 Verify before you buy

Research materials are produced in batches. A batch is a single manufacturing run: its own starting material, its own processing, its own variation. Batch identity is the only thing that connects the vial in your hand to a set of measurements — which is why a certificate without a batch number cannot tell you anything about your vial, however genuine it is.

The practical question is narrow and answerable: *does this document describe this batch, and can I confirm that with the laboratory that issued it?*

01 **Find the lot number**

On the vial, on the carton, and on the certificate. Three places, one string of characters. If any of them disagree, stop.

02 **Read the certificate as a document**

It should name the material, the batch, the analytical methods, the results, the laboratory, and a date. A certificate that names none of these is a picture, not a record.

03 **Confirm identity and purity are separate**

Identity answers "is this the right molecule?" Purity answers "how much of the sample is it?" A report with one and not the other answers half the question.

04 **Resolve the certificate at its source**

Follow a verifiable identifier — a lookup URL, a database record, a QR code — back to the issuing laboratory. This step is the difference between a document and evidence.

05 **Check quantity against the label**

Stated fill is not the same as measured content. Where content is reported, compare it with the number printed on the vial.

06 **Archive it with the batch**

Save the certificate with the date you received the material. A certificate you cannot find later is a certificate that did not exist.

> A SCREENSHOT PROVES A FILE EXISTED
>
> Screenshots are trivial to produce and impossible to authenticate. Verification means following an identifier back to its source — a lookup URL, a database record, a QR code that resolves to the issuing laboratory. If the only path is a picture on a product page, the chain ends there.

Red flags worth acting on

- × The same certificate appears on unrelated products, or carries no batch identifier at all.
- × The issuing laboratory cannot be identified, or the results have no method or date attached.
- × A screenshot is offered as verification, with no path back to the source.
- × Purity is quoted to two decimals with no chromatogram, method, or integration criteria.
- × The certificate predates the batch, or is older than the material it accompanies.
- × Claims of testing are made in marketing copy but no document is retrievable.

One more thing, because it is the most common error: a certificate that reports purity but not identity answers half the question. Purity is a percentage of something — identity is what that something is. Both belong in a document worth trusting, alongside the method and the date that produced them.

03 Bench setup

Most ruined material is ruined at the bench, not in transit. The failures are boring and repeatable: a wet septum, a shaken vial, a foaming transfer, an unlabelled container, a thick needle chewing rubber into a solution.

The kit below is the minimum for handling lyophilized material properly. It is deliberately short — treating every item as load-bearing is cheaper than replacing batches.

ITEM	WHY IT IS ON THE LIST	WHERE PEOPLE CUT CORNERS
Nitrile gloves, powder-free	Barrier and lint control at the bench; change between batches.	Latex sheds and degrades with solvent contact.
70% isopropyl pads, individually wrapped	Wipe every septum before and after a transfer; let it air-dry.	Wet alcohol carried into a vial is a contamination route, not a cleaning step.
Luer-lock transfer syringes (1–3 mL)	Diluent transfer into sealed vials without losing the volume to dead space.	Luer-slip tips pop off under pressure.
Blunt or 45° bevel transfer needles	Reaching the septum without coring rubber into the solution.	Thick, short-bevel needles core more often.
Sterile borosilicate vials + caps	Aliquoting a prepared stock without reusing a punctured container.	Re-puncturing one septum repeatedly is the usual failure point.
Fine-tip permanent marker + lab log	Material, batch, diluent volume, concentration, preparation date.	An unlabelled vial is an unknown substance.
Adjustable pipettes (P20/P200/P1000) + tips	Volumes below 0.1 mL belong on a pipette, not a syringe barrel.	Check calibration; a drifting pipette silently changes every number downstream.
Sharps container + biohazard bag	Rigid, closable, labelled. Needles point-first, lid tight, replace at three-quarters full.	A drink bottle is not a sharps container no matter how thick it looks.
Desiccant + insulated storage box	Moisture and temperature swings are the two things lyophilized material is most exposed to.	Silicone inserts, not rigid plastic, in a cold box.
pH strips or meter, and buffer stocks	Solvent choice sets stability; check the pH you actually prepared.	Extreme pH degrades peptide chains quickly and irreversibly.

Technique notes that matter more than the equipment

- **Let cold material reach room temperature before opening it.** Condensation forms on cold glass, and moisture is the thing lyophilized material is most vulnerable to.
- **Wipe, then wait.** Alcohol needs about thirty seconds to air-dry. A wet septum stings nothing in a laboratory context — it just carries solvent into the vial.
- **Aim the diluent at the glass, not the powder.** Run it down the wall and let it pool. A hard jet onto the cake creates foam, and foam is a peptide-loss event.
- **Swirl; never shake.** Roll the vial between your fingers. If the material has not dissolved, wait and swirl again rather than escalating to agitation.
- **Prefer a pipette below 0.1 mL.** Syringe barrels are poor volumetric instruments at small volumes, and the error does not announce itself.

04 Concentration and dilution

Three relationships cover almost everything you will need on a lab bench. Learn them once and the calculator becomes a check rather than a crutch.

CONCENTRATION	mg ÷ mL = mg/mL
MOLARITY	(mg/mL) ÷ MW (kDa) = mM
DILUTION	$C_1V_1 = C_2V_2$

The maths is trivial; the inputs are where errors live. Nominal fill is not measured content. Water of hydration changes the mass you are actually dissolving. Reported content per vial, where a certificate provides it, is the number worth using.

Worked example: one vial, two diluent volumes

- **10 mg vial + 2.0 mL diluent** → 5.0 mg/mL. A 1.0 mg aliquot is 0.20 mL.
- **Same vial + 1.0 mL diluent** → 10 mg/mL. The same 1.0 mg aliquot is now 0.10 mL.

The material delivered is identical. Only the volume changed — which is exactly why concentrations belong on the label, not in memory. The **1 mL per 10 mg** convention is popular for the same reason: it lands every vial at 10 mg/mL, so the arithmetic stays mental.

Worked example: molarity for a cell-based assay

- 5.0 mg/mL ÷ 2.0 kDa = **2.5 mM** stock.
- To reach 25 µM in 10 mL: V_1 = (25 µM × 10 mL) ÷ 2500 µM = **0.10 mL** of stock.
- Serial 1:10 from 25 µM gives 2.5 µM, then 250 nM — prepare these fresh from the stock rather than from each other where accuracy matters.

Blends are not single compounds

A 5:1:1:1 blend totalling 80 mg is 50 mg + 10 mg + 10 mg + 10 mg. The vial mass is the sum, not the share, and a "70 mg vial" of a fixed-ratio blend is not 70 mg of anything in particular. Calculate per component or the number is decorative.

Run the numbers before the first preparation

Our sibling publication maintains a working calculator that shows every step: researchprotocols.net/calculator takes vial mass, diluent volume and a target amount, then returns concentration, draw volume and the arithmetic in full. The reference chart holds the published rows, and the mixability matrix covers which materials tolerate sharing a solution — pH windows included.

Do this once per new vial size, before you are holding a syringe. A number checked twice is cheaper than a batch prepared at the wrong strength.

05 Storage and stability

Stability is a property of the molecule, the matrix and the container together. There is no single temperature that saves a badly handled vial, and no container that saves wet powder.

Lyophilized (dry)

- Store cold and dark — a dedicated freezer holds temperature more steadily than a kitchen unit.
- Keep desiccant in the container; moisture ingress is cumulative.
- **Freeze once.** Repeated cold-warm cycles are the damage, not the cold.
- Equilibrate to room temperature *before* opening, then reseal promptly.

Reconstituted (in solution)

- 2–8 °C, upright, short working window; do not return to the freezer without validated data.
- Aliquot so that each container is entered once.
- Preserved diluents carry their own open-container window — track it separately from the material.
- Write the preparation date on every container. Unlabelled means unusable.

Signs the material has changed

- **Dry:** discoloration, a wet or clumped mass, a cracked vial or a compromised seal.
- **In solution:** cloudiness that does not clear after refrigeration and gentle swirling, visible particulates, a color shift, gelling or thickening.
- **Either state:** a lot number that no longer matches the documentation you archived.

When in doubt, retire it. A failed preparation costs a batch; a preparation of unknown composition costs the experiment, and you will not know which result was the artifact.

06 Where the evidence stops

Every model has a boundary, and most overstatement is a boundary quietly crossed. These are the four crossings we see most often in coverage of research compounds.

- **Model to organism.** A result in a dish is a result about a dish. Absorption, distribution, metabolism and clearance are entire fields, not footnotes.
- **Amount translation.** Quantities do not transfer across species or routes by arithmetic alone. A number that worked in one setting is not the same number in another.
- **Endpoint substitution.** A surrogate marker moving is not the outcome moving. Ask which one the study actually measured.
- **Publication and reporting bias.** What gets published is a sample of what got run. Small literatures with consistent results are often small literatures with unreported failures.

And the honest floor: community reports are anecdotes. We describe them as such, because a hundred people describing the same experience is still not a controlled observation — it is a hypothesis with a large sample of self-selection.

07 Where to go next

This guide is the method. The chronicles are the application — each one takes a paper, a dataset or a certificate and states what it does and does not support.

The chronicles — latest evidence

Every article is tagged with its evidence tier.

Certificate data stories

What batch certificates in the corpus actually report, and what they omit.

Research Protocols calculator

Vial, diluent and target amount → concentration, volume, units, with the arithmetic shown.

Reference chart

One table of published reference rows for the archive's compounds.

Mixability and pH matrix

Which materials tolerate a shared solution, and which must stay single.

CertIQX certificate index

Public certificate corpus — search it before you trust a document.

Editorial policy

How claims are tiered, cited and corrected.

> CERTIFICATE VERIFICATION CHECKLIST
>
> ☐ Lot number matches across vial, carton and certificate.
>
> ☐ Certificate resolves at the issuing laboratory, not just on the seller's page.
>
> ☐ Identity and purity are both reported, with methods and dates.
>
> ☐ Quantity or content is stated, not inferred from fill size.
>
> ☐ Material arrived sealed, undamaged, and at the expected temperature.
>
> ☐ Receipt date, batch and certificate archived together.

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