Vectora LAI

SCOPE & TAXONOMY

The LAI universe, defined

A Long-Acting Injectable is a parenteral formulation engineered to extend therapeutic duration from days to months — through a **drug delivery system** or a **half-life extension** technology. Vectora defines the covered universe by three cumulative criteria.

What qualifies as a LAI

Every asset meets three cumulative criteria. All three are required.

1. **Injectable route.** The product is administered by injection: through a needle, an applicator or a cannula, without incision. Every injectable site is in scope (intramuscular, subcutaneous, intravenous, intra-articular, intravitreal and others).
2. **A deliberate duration technology.** Either a **Drug Delivery System** (the formulation releases the drug over time) or **Half-Life Extension** (the molecule is engineered to last). A long native half-life alone does not count.
3. **Duration that breaks with daily dosing.** Significantly longer than the indication's immediate-release standard, with a hard floor of ≥ **48 hours** after a single dose.

Out of scope

Some molecules are long-acting for reasons that fall outside this definition. They are excluded:

- ✕ **Long-acting by mechanism, not technology.** Bisphosphonates, botulinum toxin, native-long-half-life antibodies — the effect comes from the biological target, not a delivery or half-life technology.
- ✕ **Daily basal insulins.** Lantus, Levemir, Tresiba carry real HLE chemistry but act under 48h and are injected daily. Out. Only weekly-plus HLE insulins (e.g. insulin icodec) qualify.
- ✕ **Implants placed through an incision, or non-resorbable implants that must be removed surgically** (e.g. Testopel, Supprelin LA, Nexplanon).
- ✕ **Short or daily injectables.** Below the 48-hour floor, whatever the label suggests.
- ✕ **Vaccines, cell & gene therapy.** Out by editorial scope — unless a DDS/HLE technology carries the payload. The test is the source of the duration: engineered delivery, not the biology itself.

Thresholds by indication

"Long-acting" means something different in post-operative pain than in schizophrenia. The threshold is relative to each indication's standard of care, with the 48-hour floor underneath.

INDICATION	IMMEDIATE-RELEASE STANDARD	QUALIFYING LONG-ACTING ASSETS
Post-op pain	bupivacaine ~4–6h	EXPAREL (48h), ZYNRELEF (72h)
Opioid use disorder	daily buprenorphine	Sublocade (monthly), Brixadi (weekly–monthly)

INDICATION	IMMEDIATE-RELEASE STANDARD	QUALIFYING LONG-ACTING ASSETS
HIV / PrEP	daily oral	Cabenuva (1–2 monthly), Apretude (2-monthly), Sunlenca (6-monthly)
Schizophrenia	daily oral	Invega Sustenna (monthly), Uzedy (monthly), Hafyera (6-monthly)
Endocrine oncology	leuprolide IR	Lupron Depot, Eligard, Zoladex
Acromegaly / NET	octreotide ~4h	Sandostatin LAR, Somatuline (monthly)
Type-2 diabetes	exenatide BID	Ozempic, Trulicity, Bydureon (weekly)
Hemophilia	recombinant factor	ALTUVIIIO, Adynovate, Elocta (weekly–bi-weekly)

How the taxonomy is built

Every asset sits on one of two branches, each a set of named families.

Drug Delivery System · DDS

The **formulation** releases the drug over time. Two facets that co-exist: the **physical** form the drug takes, and any **chemical** modification that slows release. A single product can carry both — paliperidone palmitate is a drug particle suspension (physical) **and** an ester prodrug (chemical). Two orthogonal facts, two fields, each queryable on its own.

Half-Life Extension · HLE

The **molecule itself** is engineered to last longer in circulation — a PEG chain, an Fc domain, a fatty acid, a fused polypeptide, or a direct link to albumin. The duration is built into the drug substance, not into the way it is formulated or injected.

Families are the **archetypes named across the LAI field**, each mapping to a distinct set of players, IP and manufacturing. Assignment is **deterministic**: where a product could fit two physical families, a fixed rule decides — a system that **forms its depot inside the body** takes the in-situ label over the shape it ends up as. ROVI's ISM, for example, is classed **in-situ forming depot**, not microsphere, even though its particles form in situ.

The technology families, defined

The full vocabulary, one line per family, with a market example. This is the reference behind every technology tag in Vectora.

DDS · Physical release

FAMILY	WHAT IT IS	EXAMPLE
Microsphere	Polymer microparticles encapsulating the drug, injected as a suspension.	Risperdal Consta, Sandostatin LAR
Drug particle suspension	Particles of the drug itself, nano- or micro-sized, with no carrier, injected as a suspension.	Invega Sustenna, Aristada
Engineered particle	Carrier particles with a shell or matrix (silica, polymer), from micro to nano, that hold the drug.	DelSiTech, PharmaShell (platforms)
In-situ forming depot	A liquid injected that forms a gel or solid depot in the body.	Sublocade, Eligard (Atrigel), Brixadi
Gel depot	A pre-formed gel / semi-solid, injected as-is.	Somatuline, Acthar Gel

FAMILY	WHAT IT IS	EXAMPLE
Implant	A pre-formed solid implant, injected through a needle, an applicator or a cannula, without incision.	Zoladex, Ozurdex
Liposome	Lipid vesicles carrying the drug.	EXPAREL (DepoFoam)
Oil depot	The drug (often an ester) dissolved in an oil vehicle.	Nebido, decanoate depots

Matrix material — a secondary tag when a physical family applies: polymer · lipid · hydrogel · inorganic — or none when the drug is its own matrix.

DDS · Chemical release

FAMILY	WHAT IT IS	EXAMPLE
Prodrug	The drug is chemically modified (most often an ester) so it converts back slowly after injection.	Paliperidone palmitate, testosterone esters
Cleavable conjugate	The drug is linked to a carrier by a bond that cleaves slowly to release it.	TransCon (Skytrofa)

Physical and chemical **co-occur**: a product can be both (a drug particle suspension that is also an ester prodrug). That is by design — two orthogonal facts, two fields.

HLE · Mechanisms

MECHANISM	WHAT IT IS	EXAMPLE
PEGylation	A PEG chain is attached, enlarging the molecule's hydrodynamic size and slowing renal clearance.	Peginterferon, pegfilgrastim
Fc fusion	The molecule is fused to an antibody Fc domain, which recycles via the FcRn receptor.	Trulicity, ALTUVIIIO
Albumin binding	The molecule is engineered to attach directly to serum albumin — by genetic fusion or a covalent tether — and borrows its long half-life.	Idelvion (fusion), Parsabiv (covalent)
Lipidation	A fatty-acid or diacid is conjugated to the peptide.	Semaglutide, tirzepatide, insulin icodec
Glyco-engineering	Extra glycosylation shields the molecule and slows clearance.	Aranesp (darbepoetin alfa)
Protein-fusion extender	A long, unstructured polypeptide is genetically fused to add hydrodynamic bulk.	ALTUVIIIO (XTEN), Elonva (CTP)

Platform vs mechanism. A named platform (Atrigel, TransCon, PASylation…) is the branded implementation; the family is the mechanism class it belongs to. That is why "PASylation" sits as a platform under **protein-fusion extender**, alongside XTEN, ELP and CTP, rather than as its own mechanism.

Frequently asked questions

> **Why isn't PASylation its own mechanism, like PEGylation?**
>
> A mechanism family is a class we query, not a brand. PEGylation, Fc fusion and lipidation are mechanism classes. PASylation is a **platform** — like XTEN, ELP and CTP — whose mechanism is steric bulk from a fused polypeptide, which we label **protein-fusion extender**. A mechanism becomes its own family only when it is both autonomous and queried as a class; these platforms share one mechanism and differ by chemistry, so we group the mechanism and name the platform separately.

How do lipidation and albumin binding differ?

Lipidation names a chemistry: a fatty acid conjugated to the peptide. **Albumin binding** names a different family — molecules engineered to attach directly to albumin, by genetic fusion or a covalent tether (Idelvion, etelcalcetide). A lipidated peptide such as semaglutide is classed by its chemistry, lipidation; that it then binds albumin in circulation is its mechanism, carried by the family, not a second tag — the same way a PEGylated molecule is classed by PEGylation, not by the steric effect PEG produces.

Why are long-acting antibodies excluded, but Fc-fusion proteins included?

The test is the **source of the duration**. A monoclonal antibody is already long-lived by its nature — an IgG half-life of ~3 weeks, sometimes stretched by generic Fc/FcRn engineering (YTE-type). That is antibody biology, not a delivery technology, so it is out (e.g. Depemokimab, Marstacimab). An **Fc-fusion protein** bolts an Fc onto a molecule that would otherwise be short-acting — a deliberate, proprietary HLE construct — so it is in (e.g. ALTUVIIIO). An antibody enters the moment it carries a proprietary DDS/HLE technology of its own. What decides is whether the long action was **engineered onto the molecule** or is **native to its class**.

Why is ROVI's ISM classed as in-situ forming depot, not microsphere?

A system that **forms its depot in the body** takes the in-situ label over the shape it ends up as — the tie-break for products that could fit two physical families. ISM is injected as a liquid and its particles precipitate in situ; classing it in-situ keeps that query complete and consistent across the base.

Can one product be in two families at once?

Yes, in two places. Across the two **DDS** facets — a product can be a physical family and a chemical family at once (a drug particle suspension that is also an ester prodrug: paliperidone palmitate). And in **HLE**, when a molecule stacks two distinct extension technologies — ALTUVIIIO carries both an Fc fusion and an XTEN polypeptide. A lipidated peptide is not such a case: it is classed by its chemistry, lipidation, alone.

And daily basal insulins, or antibodies dosed monthly?

Out. Daily basal insulins (Lantus, Levemir, Tresiba) carry real HLE chemistry but act under 48h and are injected daily — only weekly-plus HLE insulins (e.g. insulin icodec) qualify. A monthly antibody whose duration is native IgG biology is out for the reason above — unless it adds a proprietary LAI technology.

The data model

- **Entities** — companies, assets, marketed products (trademarks), technologies, indications.
- **Two grains** — each **asset** is a molecule × delivery technology × developer — sized and segmented by phase, technology, target or modality; each **product** is a brand × authority — the real regulatory profile, FDA against EMA, label by label.
- **Provenance** — sourced to the primary record: products to their FDA / EMA label, assets to ClinicalTrials.gov and company disclosures.