Lipoparticle Purity and Stability

Stable Expression of Membrane Proteins

Integral membrane proteins depend on a lipid bilayer to maintain their native structure, a requirement that often limits their use in biochemical studies. For example, GPCRs can denature in the absence of an intact lipid bilayer, making them difficult to purify and manipulate. Integral Molecular has developed Lipoparticle technology to provide a convenient, concentrated, and stable expression format for membrane proteins that overcomes many of the limitations of working with this challenging class of protein targets. Lipoparticles undergo rigorous quality control measures, ensuring that only the highest quality Lipoparticles are provided to customers. Each lot of Lipoparticles exhibits consistently high levels of structurally intact receptors to provide optimal assay sensitivity and reproducibility. Integral Molecular has over 10 years of experience making Lipoparticles and expressing difficult membrane proteins.

The Lipoparticle

Lipoparticles are non-infectious, enveloped virus-like particles (VLPs) that stably capture and incorporate high concentrations of user-specified membrane proteins. Since membrane proteins incorporated into Lipoparticles are retained directly in their native cell-derived lipid bilayer, they remain structurally intact and maintain a stable conformation. The generation of Lipoparticles through the VLP budding process ensures that Lipoparticles are homogeneous in size, contain high concentrations of target receptor, and are free from intracellular contaminants and inverted receptors. Each lot of Lipoparticles produced at Integral Molecular undergoes stringent quality control measures, employing up to 16 metrics to assess biochemical properties such as particle and receptor concentration, particle purity, and receptor integrity (**Table 1**).

Lipoparticle Quality Control
Lipoparticle Purity • Homogeneity • Polydispersity • Protein concentration • Absence of protein contaminants • Size of population • Absence of aggregation
Receptor Integrity • Conformational integrity • Size verification • Absence of degradation products
Lipoparticle and Receptor Concentration • Relative quantity of Lipoparticles • Quantification of incorporated receptors

Table 1. Quality control assessment of Lipoparticles.

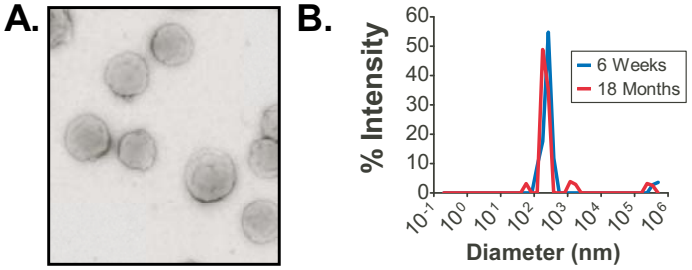

Figure 1. Integral Molecular Lipoparticles are pure and homogeneous following long-term storage. A. Electron microscopy (EM) of Lipoparticles illustrates homogeneity. **B.** The Dynamic Light Scattering (DLS) profile of Lipoparticles stored for 18 months at 4°C is nearly identical to the profile observed after 6 weeks of storage.

Technical Description

Lipoparticles expressing the GPCR CXCR4 were evaluated for purity and stability using multiple quality control assays. Electron microscopy (EM) and Dynamic Light Scattering (DLS) of CXCR4-Lipoparticles demonstrate homogeneity (~150 nm) and purity, with no detectable degradation, aggregation, or cellular contaminants (**Figure 1**). The DLS profile remains essentially unchanged after 18 months of storage at 4°C, indicating long-term stability of Lipoparticles. Western blot and conformationally-sensitive ELISA assays confirm the absence of CXCR4 degradation and the maintenance of structurally intact CXCR4 after long-term storage at both 4°C and -80°C (**Figure 2**).

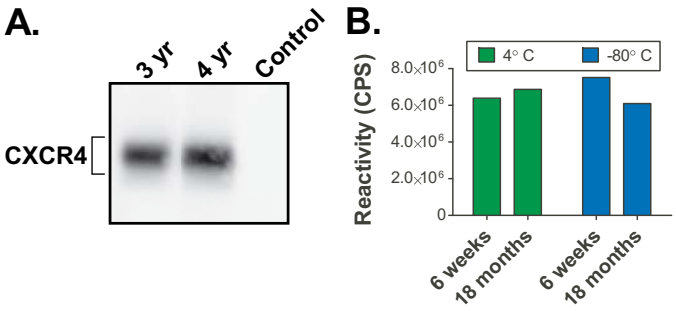

Figure 2. Lipoparticles maintain structurally intact receptors. A. CXCR4-Lipoparticles were assayed by western blot after up to 4 years of storage at -80°C, confirming the absence of receptor degradation. **B.** ELISA assays were conducted using a conformationally-sensitive antibody to detect CXCR4 after storage of Lipoparticles at 4°C and -80°C for up to 18 months.

Contact Us

Lipoparticles are produced with customized membrane proteins, and are validated for use with specific applications. Sample kits are available for purchase for preliminary testing. For more information contact us at:

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