BioSpectrum
the business of Bio & Health Sciences
ASIA EDITION

ABio on developing LANFA as a next-generation alternative to PEG in drug delivery

August 25, 2026 | Opinion | By ernest.teck@mmactiv.com

CEO Koichi Yoshimi discusses the companyâ??s LANFA and LNP-LANFA platforms, their potential in nucleic acid delivery and oncology, and the preclinical and partnering milestones ahead.

Drug delivery technologies have become increasingly important as pharmaceutical developers work with complex molecules, nucleic acids, and therapies that require more precise control over how active ingredients move through the body.

Polyethylene glycol (PEG) has long played a central role in drug delivery and lipid nanoparticle formulations, but concerns around immune recognition and reduced delivery efficiency following repeated administration have encouraged researchers to explore alternatives.

A Biotech Co. Limited (ABio) is developing LANFA, a water-solubilising agent designed as a potential alternative to PEG, alongside its LNP-LANFA lipid nanoparticle platform. Preclinical studies have indicated altered biodistribution compared with conventional LNPs, while the company is also investigating applications in poorly water-soluble drugs, vaccines and cancer therapeutics.

In an interview with Koichi Yoshimi, CEO of A Biotech Co. Limited, we discuss the science behind the platform, its emerging preclinical data, and the development and partnership strategy required to move LANFA closer to clinical use.

What unmet needs in current drug-delivery systems led ABio to develop LANFA as an alternative to polyethylene glycol (PEG), and what are its key advantages over existing approaches?

Currently, drug delivery systems (DDS) are essential for safely encapsulating and transporting drugs to target sites in the body. PEG has long been one of the most widely used substances for DDS applications. While PEG is relatively safe among the water-solubilisation technologies used to protect drugs and ensure their stable transport within the body, it can be recognised as a foreign substance in some individuals, potentially triggering an immune response. Repeated

administration has also been shown to reduce drug-delivery efficiency.

To address these challenges, ABio developed LANFA, a novel water-solubilising agent, as a potential alternative to PEG, with the aim of addressing some of the limitations associated with PEG-containing delivery systems, including immune recognition and reduced delivery efficiency following repeated administration. Our studies to date have generated encouraging preclinical results, and further studies are underway to characterise LANFA's immunogenicity, safety and delivery performance. (see Table 1).

Furthermore, combining LANFA with LNPs (lipid nanoparticles), such as those used in mRNA vaccines and other applications, has the potential to enable efficient delivery of nucleic acids into immune cells.

This positions LANFA as a potential new platform technology for drug delivery, with the aim of improving biocompatibility and delivery performance.

Your preclinical studies showed a 3.3-fold improvement in the spleen-to-liver distribution ratio with LNP-LANFA. What is driving this change in biodistribution, and what could it mean for applications such as vaccines and immune-based therapies?

We believe that the change in the in vivo distribution of LNP-LANFA seen in our preclinical studies reflects the influence of LANFA on the surface properties and pharmacokinetics of the LNPs.

Conventional PEGylated LNPs often show substantial hepatic distribution following systemic administration, influenced in part by interactions with serum proteins such as apolipoprotein E. Our results suggest that incorporating LANFA changes the biological interactions of the LNP surface, resulting in reduced relative liver distribution and increased relative splenic distribution. The precise mechanisms responsible for this shift are still under investigation.

LANFA also incorporates ester linkages designed to be more readily cleavable under biological conditions than the ether backbone characteristic of PEG, which may offer advantages in biodegradability. This is one of the areas we intend to investigate further.

LNPs incorporating LANFA (LNP-LANFA) showed reduced liver distribution and a relative increase in distribution to the spleen. As a result, the spleen-to-liver distribution ratio improved by approximately 3.3-fold compared with conventional LNPs (see Table 2).

These properties are particularly significant for vaccines and immunotherapy. Because the spleen contains a large number of immune cells, enhanced delivery to splenic immune-cell populations could be advantageous for applications designed to induce or modulate immune responses.

LNP-LANFA therefore has strong potential across a range of nucleic acid therapeutics, including mRNA vaccines and cancer immunotherapy.

Following these murine results, what additional preclinical or safety data will be needed to establish whether LNP-LANFA can progress towards human studies?

We are currently finalising the next stage of our preclinical development programme to determine the data required to support eventual clinical translation, and are in discussions with a pharmaceutical company that is a potential collaborative research partner. We plan to conduct the following five studies this year:

1. Spleen Cell Analysis
   Evaluate and compare the uptake and expression profiles of LNP-PEG and LNP-LANFA in splenic immune cells.
2. Accelerated Blood Clearance (ABC) Analysis
   Evaluate whether repeated administration alters the pharmacokinetic profile or induces accelerated blood clearance, and compare this effect between LNP-PEG and LNP-LANFA.
3. In vivo distribution study using luminescence
   Compare the expression patterns and tissue distribution of pDNA and other molecules delivered by LNP-PEG and LNP-LANFA.
4. Toxicity studies
   Assess toxic reactions following administration, including hepatotoxicity, systemic adverse reactions, and changes

in major-organ weights.

5. Cytokine measurement
   Measure the immune response, degree of inflammation, and safety following administration.

The results will help define subsequent IND-enabling studies, including more comprehensive toxicology, pharmacokinetic, biodistribution and CMC requirements in consultation with our development partners and relevant regulatory authorities.

Beyond vaccines and immunotherapies, which therapeutic modalities or disease areas do you believe could benefit most from the LANFA and LNP-LANFA platforms?

LANFA's inherent high water solubility and biocompatibility make it well suited to poorly water-soluble drugs. We are exploring two complementary approaches. In the first, LANFA is chemically conjugated to poorly soluble drugs such as paclitaxel (PTX) to improve aqueous solubility. In the second, DMG-LANFA is used as a formulation component to disperse paclitaxel without chemically modifying the drug itself.

With paclitaxel (PTX), LANFA achieved water solubilisation without requiring Cremophor EL/ethanol in the formulation. This could potentially avoid formulation-related adverse effects associated with Cremophor EL/ethanol, including hypersensitivity reactions and central-nervous-system toxicity, although this will need to be established in further preclinical and clinical studies. In water solubility evaluation experiments, binding LANFA to paclitaxel increased its water solubility more than 100,000-fold. We are also exploring other poorly water-soluble drugs and plan to conjugate LANFA to SN-38, a potent anticancer agent, to improve its solubility.

In the second study, we dispersed paclitaxel by mixing it with DMG-LANFA without altering its chemical structure (see Table 3), achieving good dispersion at the nano- to molecular level.

In an MTT assay, the DMG-LANFA formulation demonstrated concentration-dependent cytotoxic activity, with cell viability decreasing to approximately 10% at higher concentrations. These findings are encouraging, but further in-vivo studies will be required to determine pharmacokinetics, tolerability, tumour exposure and antitumour efficacy. (see Table 4).

Furthermore, LNP-LANFA shows strong potential as a next-generation DDS for solid tumours. Here, we see promise in a targeting approach that decorates the LNP surface with antibodies or peptides against cancer-specific antigens, such as HER2 and EGFR.

ABio held 37 meetings with pharmaceutical, biotech and research organisations at BIO USA 2026. What types of licensing, co-development or research partnerships are you now looking to establish, and what would an ideal collaboration involve?

Given LANFA's broad potential across different molecules and therapeutic areas, we envision a flexible partnering model that may include non-exclusive licensing, molecule- or indication-specific licensing, co-development and sponsored research collaborations. An ideal partner would contribute complementary capabilities in formulation development, disease biology, CMC, regulatory development and clinical execution, while ABio contributes the LANFA platform, formulation know-how and associated intellectual property. Conjugating LANFA to poorly water-soluble compounds may offer differentiated formulation characteristics and create opportunities for partners to develop additional molecule-, formulation- or indication-specific intellectual property around LANFA-enabled products.

For LNP-LANFA, we are seeking to establish a joint development partnership with a pharmaceutical company that can lead next-generation vaccine development end to end, from formulation through preclinical and clinical trials, New Drug Application (NDA) submission, and on to market launch and sales.

6. Looking ahead, what are ABio's next development milestones for LANFA and LNP-LANFA, and what is the anticipated pathway and timeline towards further preclinical studies, regulatory development and eventual clinical evaluation?

LANFA Development Roadmap and Milestones

For LANFA, our near-term focus in 2026 is completing nonclinical validation of PTX-LANFA and securing partnerships, having established encouraging water-solubility and preliminary preclinical data.

In 2027, we are targeting partner-funded joint development aimed at advancing PTX-LANFA towards investigational new drug (IND)-enabling development and, subject to successful results and regulatory requirements, eventual clinical evaluation.

From 2028 onwards, we plan to extend the platform to further poorly water-soluble drugs such as SN-38 and to license our “regeneration platform for poorly soluble drugs” to multiple companies.

LNP-LANFA Development Roadmap and Milestones

For LNP-LANFA, we completed initial proof-of-concept preclinical studies and filed patent applications covering multiple potential applications. An MOU with a major pharmaceutical company is scheduled to be signed in 2026. Our next objective is to complete the additional preclinical studies required to characterise immune-cell uptake, repeated-dose behaviour, biodistribution and safety.

Subject to successful preclinical results, regulatory requirements and partnership progress, our target from 2027 is to advance into partner-led IND-enabling development, including CMC and toxicology programmes.

In 2028 and beyond, we have plans to reinvest revenue in expanding our LANFA-based solubility-enhancement platform for poorly water-soluble drugs and developing a next-generation LANFA-based LNP platform, with the aim of broadening their applications across additional therapeutic areas.