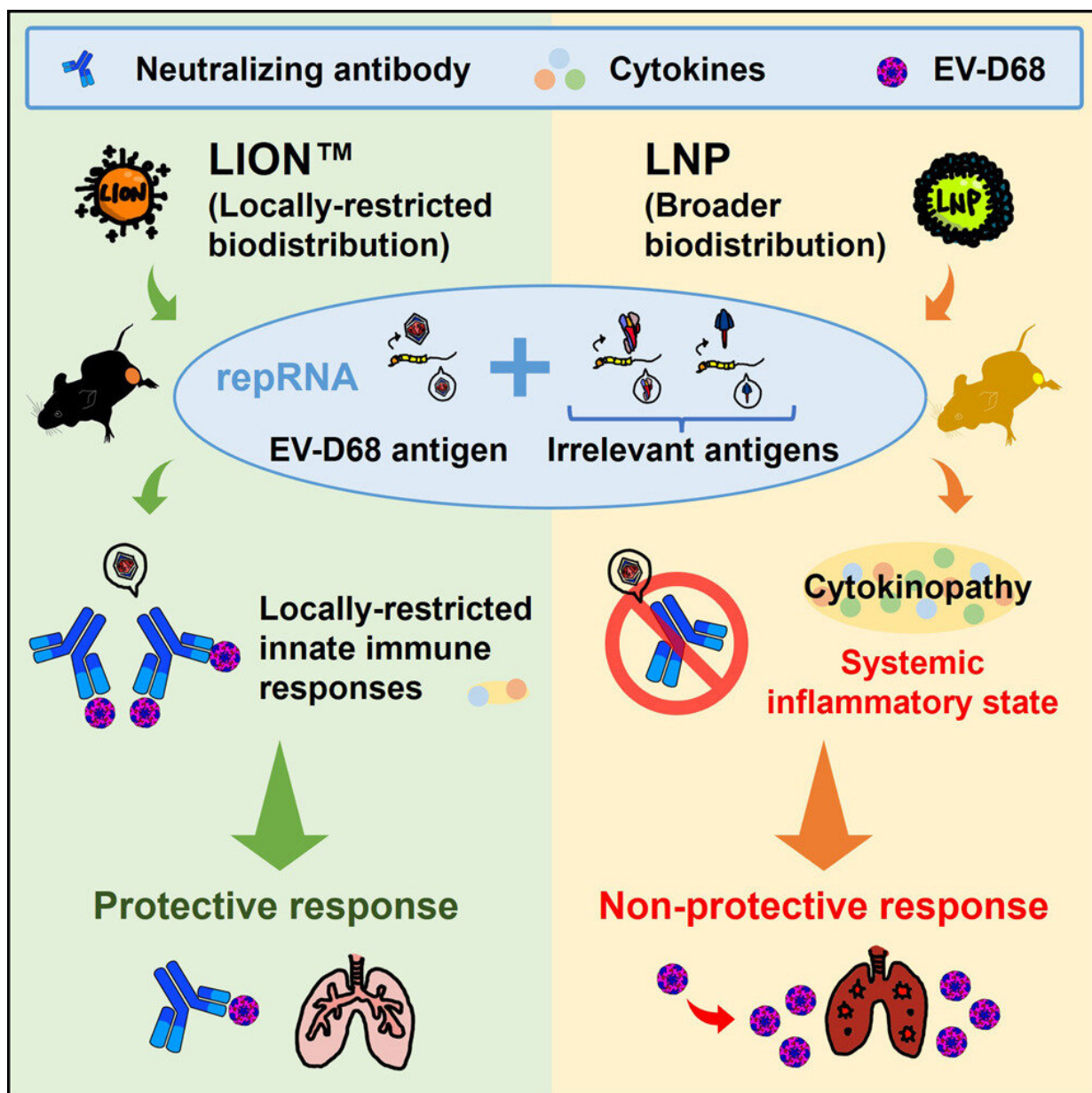


New study reveals self-replicating RNA and novel vaccine delivery technology demonstrate enhanced safety and efficacy

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Graphical abstract. Credit: *Molecular Therapy* (2023). DOI: 10.1016/j.ymthe.2023.06.017

As the world continues to combat various infectious diseases, the development of novel vaccine technologies remains at the forefront of scientific research. mRNA-based vaccines and utilization of lipid nanoparticles (LNPs) for their delivery, have recently shown encouraging results in diseases such as COVID-19.

However, a critical concern revolves around the wide biodistribution of LNPs in the body, which, in some cases, may result in unintended side effects. A recent publication in the journal *Molecular Therapy* unveils the promise of HDT Bio Corp.'s AMPLIFY [vaccine](#) platform that combines self-replicating RNA (repRNA) with its localizing cationic nanocarrier (LION) formulation. The preclinical data showcased a more favorable safety profile and increased efficacy of repRNA vaccines delivery with LION technology compared to repRNA vaccines delivered by LNPs.

The study, conducted in a [mouse model](#), revealed that intramuscular administration of repRNA with LION technology (repRNA/LION) led to localized RNA expression primarily in the muscle. In contrast, repRNA delivered by LNPs (repRNA/LNP) exhibited broader distribution throughout the body. This localization of RNA expression in the muscle demonstrates the potential of the LION technology to optimize vaccine targeting and delivery.

Moreover, the research findings indicated that repRNA/LNP triggered both local and systemic innate immune/[inflammatory responses](#), whereas

repRNA/LION confined innate immune activity to the local injection site without eliciting a systemic inflammatory response. This critical distinction highlights the safety advantages of the LION formulation, as it minimizes the risk of widespread inflammation while still generating robust immune responses.

Interestingly, despite the absence of a systemic reactogenicity, repRNA/LION induced a comparable antibody and T cell response to repRNA/LNP. This finding demonstrates that the LION-formulated repRNA vaccination is capable of eliciting strong immune responses, even without the need for a systemic distribution, further supporting its safety and efficacy as a vaccine platform.

In a multivalent vaccine design, repRNA/LION proved to be highly effective, eliciting potent neutralizing antibody responses to each antigen. This capability holds significant promise for the development of vaccines targeting multiple pathogens or antigens simultaneously, thereby enhancing protection against various diseases.

Dr. Steve Reed, Chief Executive Officer of HDT Bio and co-author of the study, emphasized that the outcomes illustrate the transformative potential of the AMPLIFY platform to aid in global immunization efforts while overcoming safety concerns associated with many LNP-delivered RNA vaccines. The unique properties of the LION delivery system significantly improve the safety, immunogenicity, and efficacy of RNA vaccines, making AMPLIFY a promising next-generation vaccine technology.

More information: Taishi Kimura et al, A localizing nanocarrier formulation enables multi-target immune responses to multivalent replicating RNA with limited systemic inflammation, *Molecular Therapy* (2023). [DOI: 10.1016/j.ymthe.2023.06.017](https://doi.org/10.1016/j.ymthe.2023.06.017)

Provided by HDT Bio Corp.

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