Nanoparticle vaccines: A potential leap forward in veterinary medicine

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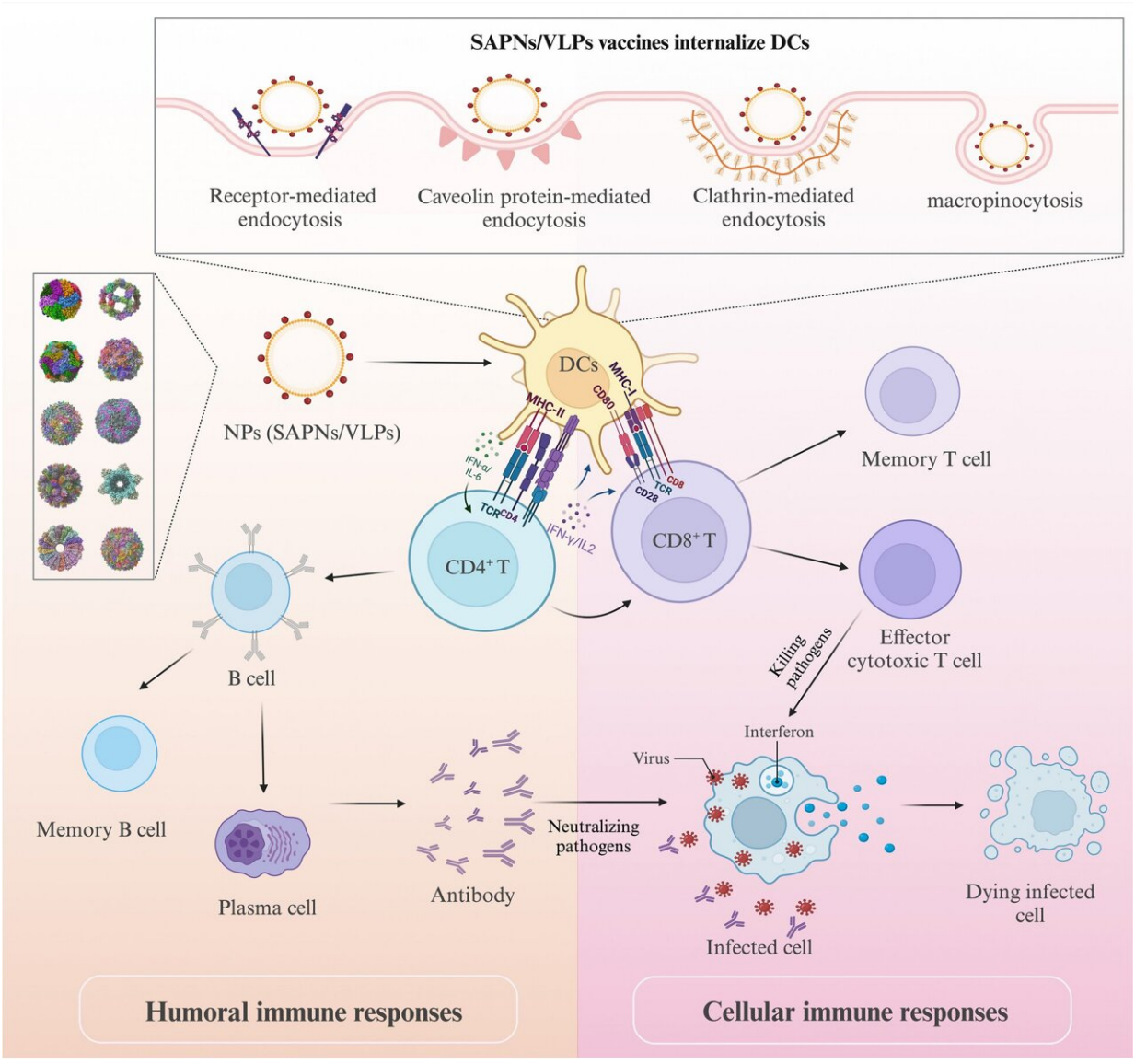

Adaptive immune activation induced by NP (SAPN/VLPS) vaccines. Credit:

Animal Diseases (2024). DOI: 10.1186/s44149-024-00119-w

Classical vaccines often rely on traditional technologies, such as live attenuated or inactivated pathogens, which carry inherent risks including reduced immunogenicity under certain conditions and potential safety concerns. This has spurred the need for innovative approaches that can provide safer and more effective prophylactic solutions in veterinary medicine.

Self-assembled protein nanoparticles (SAPNs) emerge as a cutting-edge solution, harnessing the power of nanotechnology to revolutionize vaccine design and implementation.

In an article published on 10 May 2024 in *Animal Diseases*, researchers at Zhejiang University's Institute of Preventive Veterinary Medicine, delve into the development and application of SAPNs and virus-like nanoparticles (VLPs), offering a detailed discussion of their potential in veterinary medicine.

The article focuses on various types of SAPNs, including natural and synthetically designed nanoparticles. These nanoparticles are tailored to enhance the immune system's ability to recognize and respond to pathogens more effectively.

Key highlights include the use of animal virus-derived nanoparticles and bacteriophage-derived nanoparticles, which have shown the potential to elicit strong cellular and humoral responses. The nanoparticles' ability to mimic pathogen structures enables them to trigger a more substantial immune reaction, potentially leading to long-lasting immunity.

Researchers have documented successes in using these nanoparticles to

protect against diseases like foot-and-mouth disease and swine fever, showcasing their broad applicability and effectiveness.

Dr. Fang He, a principal investigator of the article, stated, "Nanoparticle vaccines have demonstrated enormous promise and should be considered promising techniques in veterinary vaccine development."

Veterinary nanoparticle vaccines have broad implications, with the potential to extend the benefits beyond veterinary applications into human health. The enhanced safety and immunogenicity of these vaccines could lead to the development of advanced vaccines for human use.

Additionally, by reducing the environmental impact of livestock diseases, this technology may contribute to more sustainable agricultural practices globally.

More information: Meiqi Sun et al, Toward innovative veterinary nanoparticle vaccines, *Animal Diseases* (2024). DOI: 10.1186/s44149-024-00119-w

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