Sensitive Methods for Measuring Proportion of Genome-filled AAV Vector

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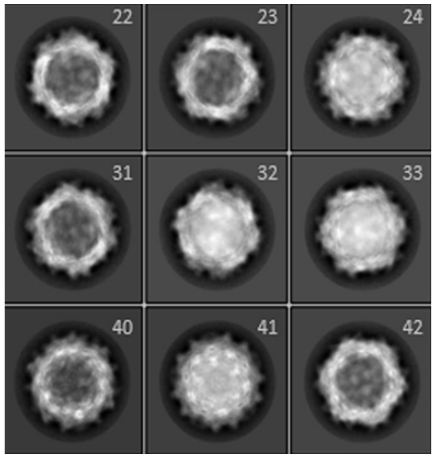

Genome-filled and empty capsids.

Technology Summary

Adeno-associated viruses (AAV) are common gene therapy vectors. However, AAV transgene packaging is usually imperfect. Despite continuing efforts to improve yield, the persistence of unpackaged virions remains a major challenge for efficient AAV vector production. Empty capsids pose several liabilities, including promoting an immune response without the therapeutic benefit of delivering the intended payload.

An accurate method of assessing the proportion of empty particles in an AAV preparation is critical for determining sample quality and optimizing large scale vector production. Optical density measurements, including ELISA, qPCR, and negative stain TEM, are currently used for vector quantification. However, these methods tend to be imprecise and can cause damage to the capsid.

Application & Market Utility

Utilizing Cryo-electron microscopy (cryo-EM) imaging, the inventors created a robust method of estimation of the ratio of full to empty capsids. Cryo-EM allows for particle visualization in native or near-native states, ensuring fidelity of the capsid and straightforward estimation of DNA-filled vs. empty capsid populations. Novel analysis methods allow for resolution of sample composition within a 1% range of error and 95-99% confidence level. The methods may be utilized to visualize effective packaging for a broad range of viral vectors (lentiviruses/nanoparticles).

Next Steps

Seek a commercial partner for continued development.

TECHNOLOGY READINESS LEVEL 1-3

Seeking

Licensing |

Keywords

- AAV
- Viral Vectors
- Viral Packaging
- Gene therapy

Researchers

Susan Hafenstein, PhD
Associate Professor of Medicine, Biochemistry and Molecular Biology, and Microbiology and Immunology
Website

Suriyasri Subramanian, PhD
Graduate Student, Department of Medicine

Originating College
Eberly College of Science

Office of Technology Management Contact
Long, Melissa
mkl137@psu.edu
814-865-5730