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Raman Spectroscopy for Non-destructive Characterization of Viral Particles During Flow

A new Raman spectroscopy method enables non-destructive, continuous monitoring of virus-like particles for improved quality control in vaccine and gene therapy production.

Researchers at Purdue University have developed a method using Raman spectroscopy to non-destructively detect molecular fingerprints of virus-like particles (VLPs). This is the first attempt of using Raman spectroscopy to continuously detect VLPs for vaccine manufacturing. Current methods for determining quantity and quality of viral particles are employed at-line or off-line. The researchers' method continuously monitors viral particles in a continuous bioprocess setup. The invention will support the advancement of viral vector-based gene therapies and vaccine production.

Technology Validation: The researchers characterized attenuated human cytomegalovirus (CMV) at a concentration between 4.5 x 109 particles/mL to 2.9 x 1011 particles/mL at flow rates between 50 ÂµL/min to 250 ÂµL/min. For all the concentrations and flow rates, the Raman peak remains in the same position, and it increases in intensity with higher flow rate and concentration. To determine if Raman analysis is destructive to the VLPs, the researchers tested the VLPs before and after Raman analysis with Western blot and SDS-PAGE; the results showed no damage.

Advantages

- non-destructive analysis

- versatile (potentially capable of characterizing multiple types of VLPs)

Applications

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Category
Biotechnology & Life Sciences/Bioprocessing & Biomanufacturing
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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- continuous monitoring of quantity and quality of VLPs

- vaccine production

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Intellectual Property:

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