Xtal Concepts

Newsletter

Combined Imaging and *in plate* Dynamic Light Scattering

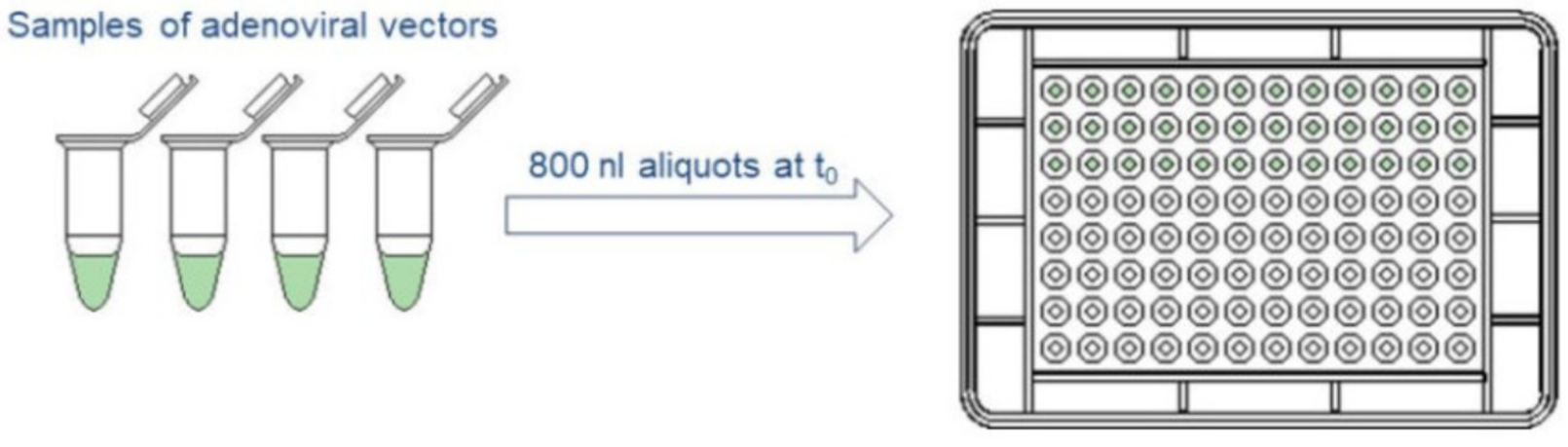
XtalConcepts GmbH
Hamburg, Germany

Please find more information about the system on our website:
www.xtal-concepts.de

The Sample: Adenoviral mRNA Vectors

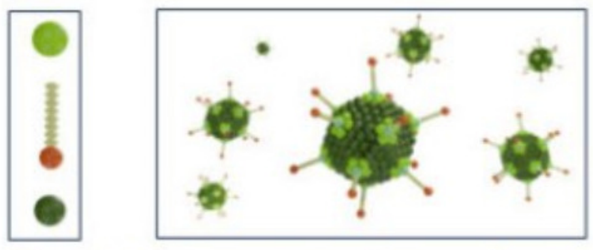
Preparation of various Adenoviral Vectors for *in plate* DLS Analysis

800 nl aliquots from several batches were transferred to a 96-well Douglas Instruments plate and sealed with paraffin oil.

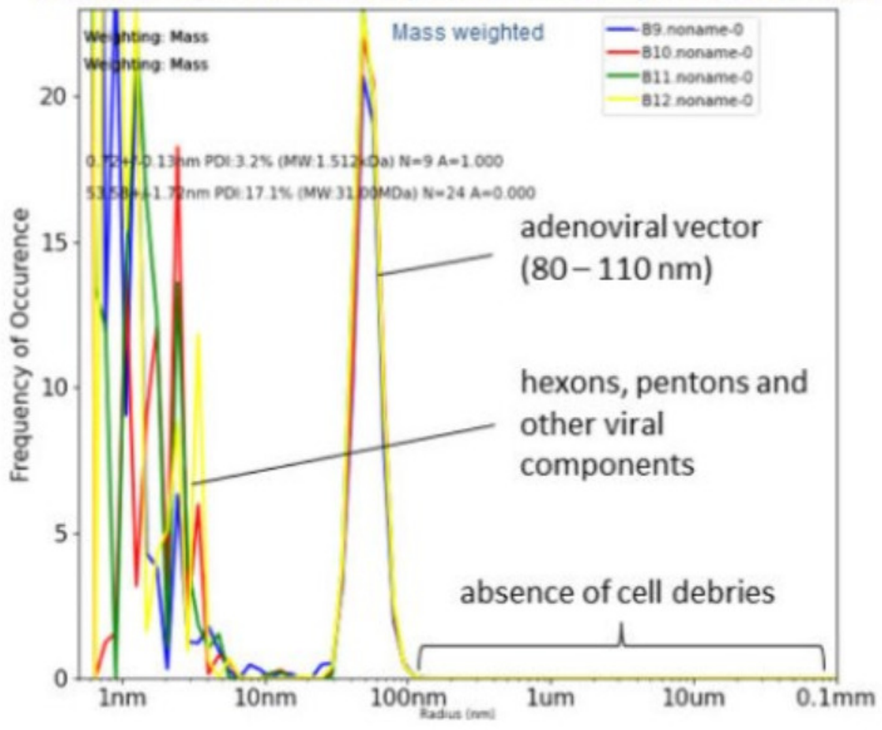


Vector Purity Assessment based on Size Distribution Analysis

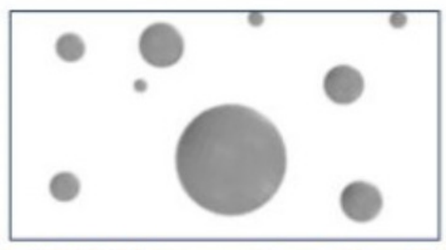
Mass-weighted size distribution monitoring of the ratio of fully assembled viral vectors to residual components.



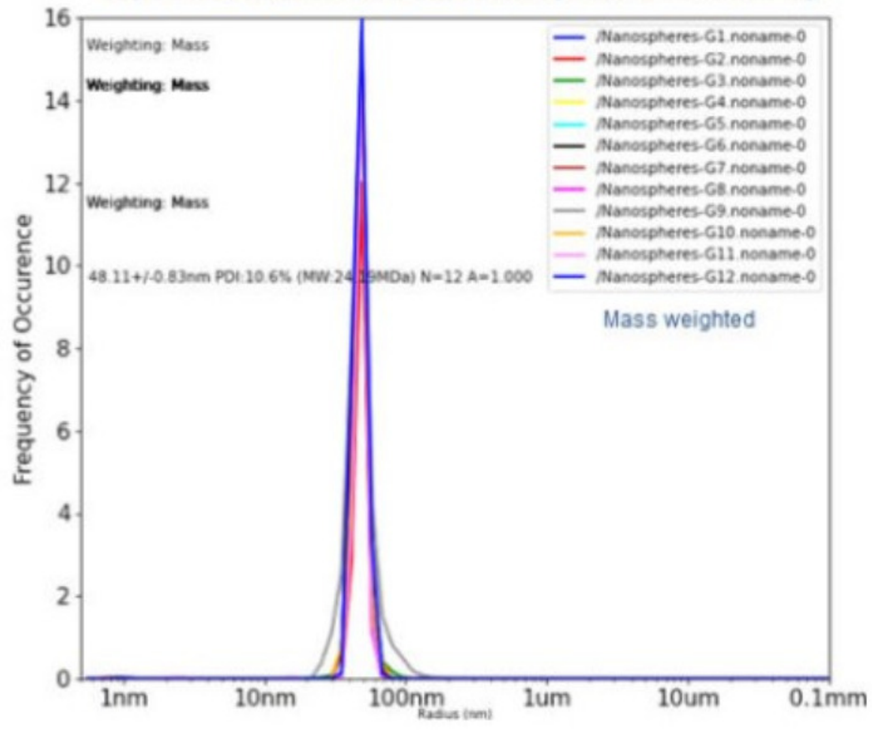
Size distribution comparison on four samples of **adenoviral vectors** that possess incomplete assemblies



LATEX, R_h = 50 nm +/- 6 nm



Control: **LATEX Nanosphere Size Standard** of the expected adenovirus size and particle uniformity

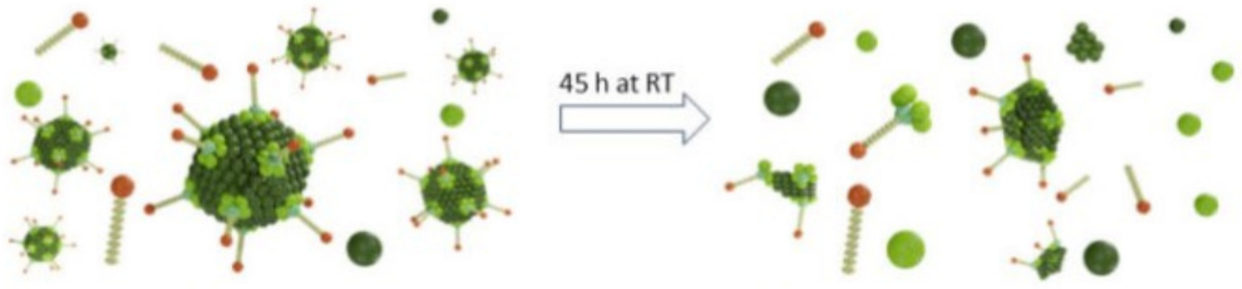


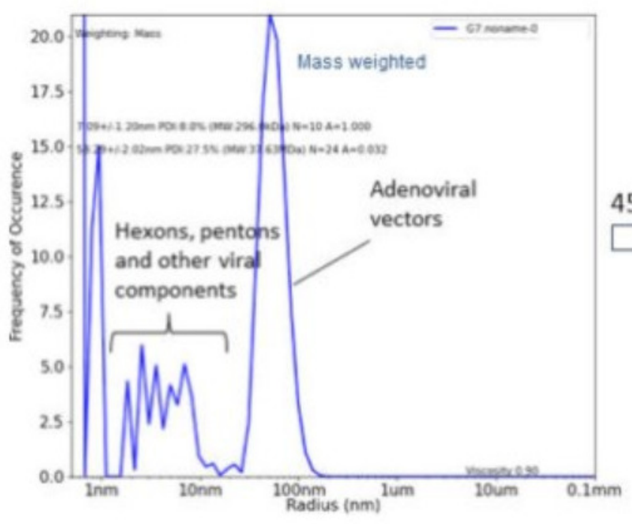
Size Distribution Signature of an instable adenoviral Vector when incubated at Room Temperature

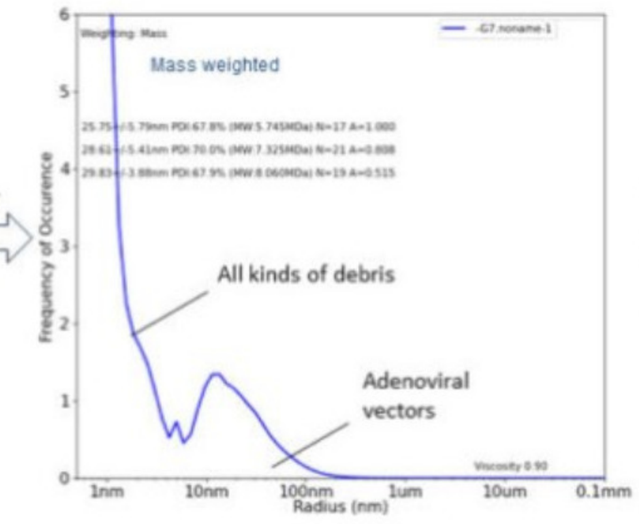
Monitoring the decay of adenoviral vectors at room temperature (weighted mass distribution)

Size distribution of adenoviral vectors at t_0

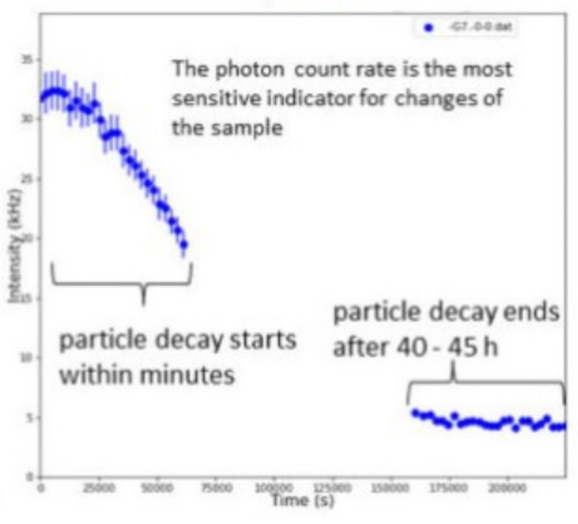
Size distribution of adenoviral vectors at t_0 + 45 h





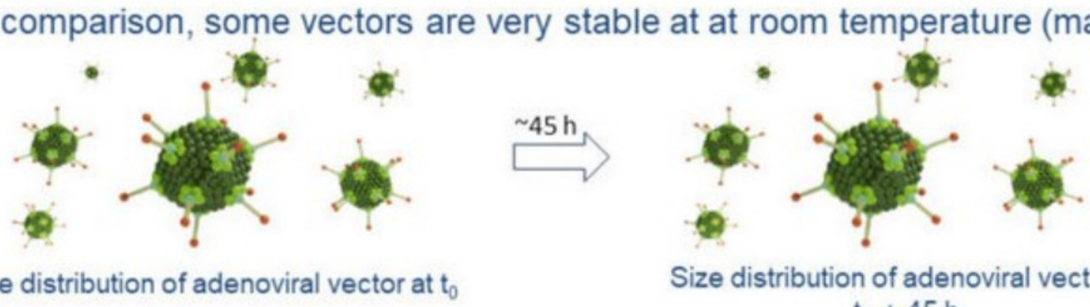


Photon Count Rate of the two scans t_0 and t_0 + 45 h



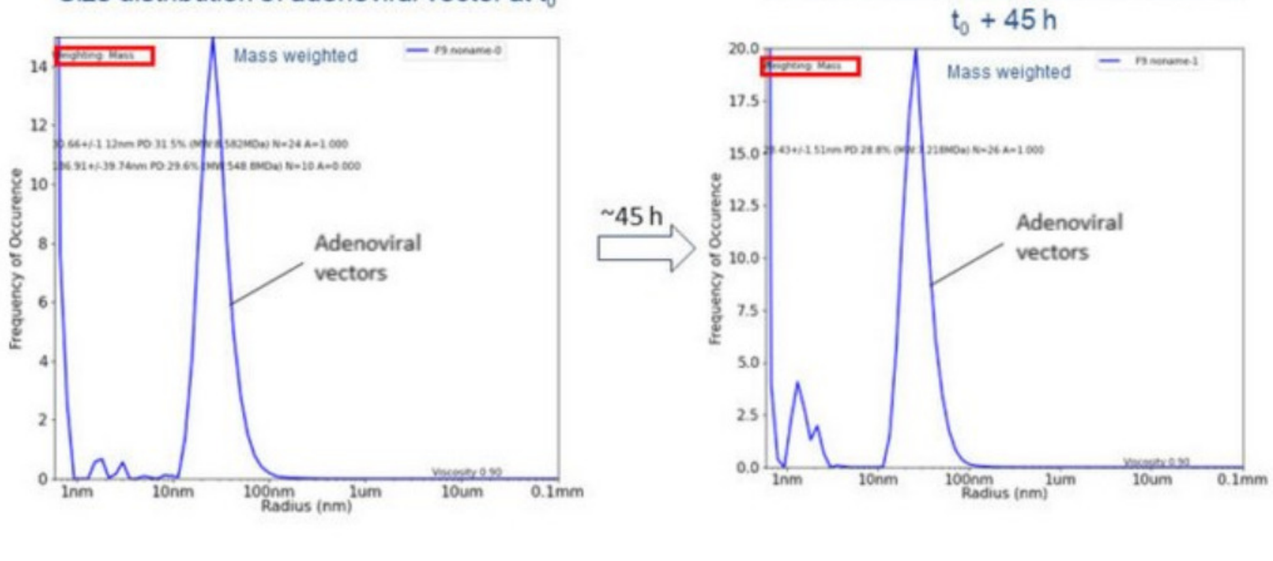
Size Distribution Signature of a stable adenoviral Vector when incubated at Room Temperature

As a comparison, some vectors are very stable at at room temperature (mass distribution weighted)

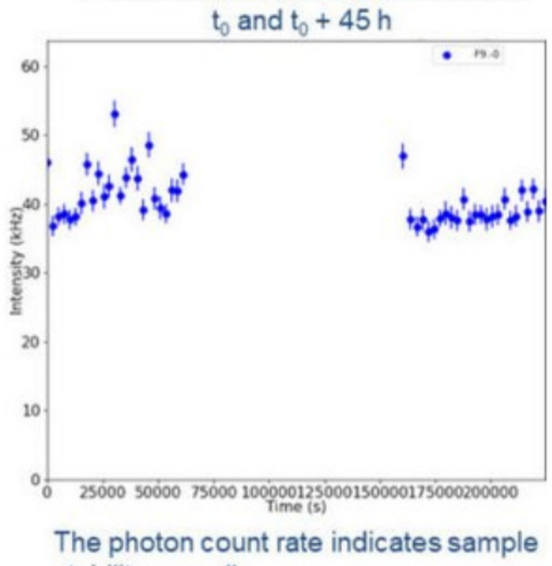


Size distribution of adenoviral vector at t_0

Size distribution of adenoviral vector at t_0 + 45 h



Photon Count Rate of the two scans t_0 and t_0 + 45 h

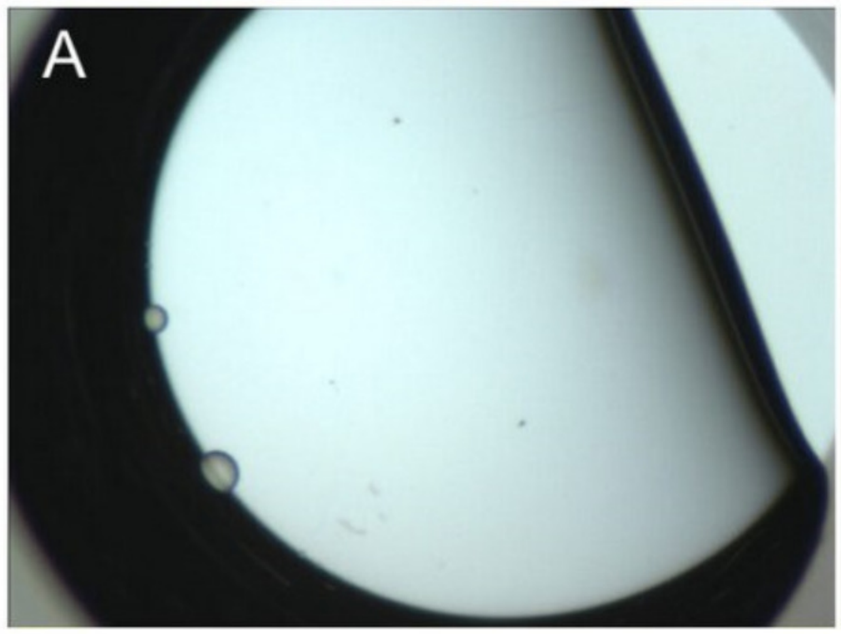


The photon count rate indicates sample stability as well

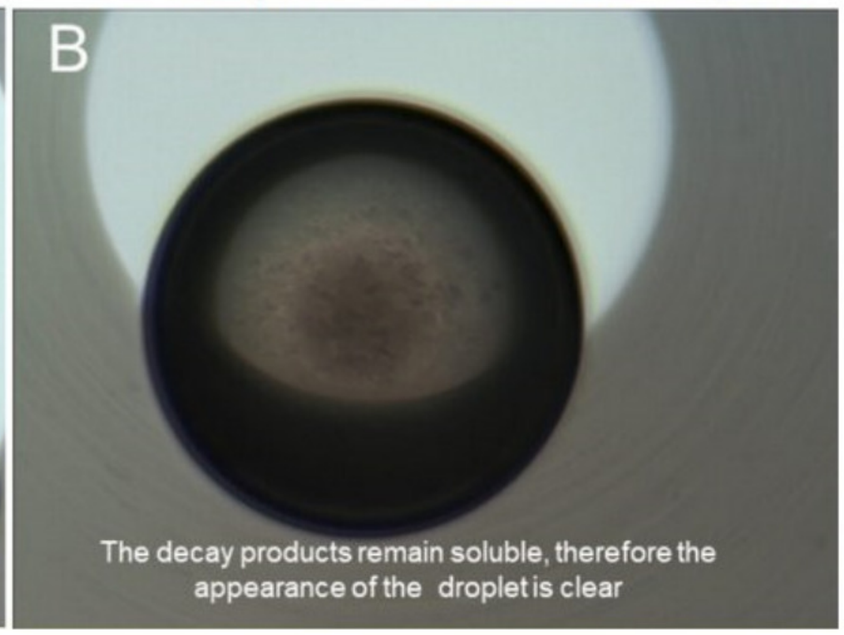
Visual Inspection of two instable adenoviral Vectors

The degradation products remain soluble, so the appearance of the droplet is clear (A). Other adenovirus samples were full of colloidal impurities (B).

Adenoviral vector sample A, bright light image at t_0 + 45 h



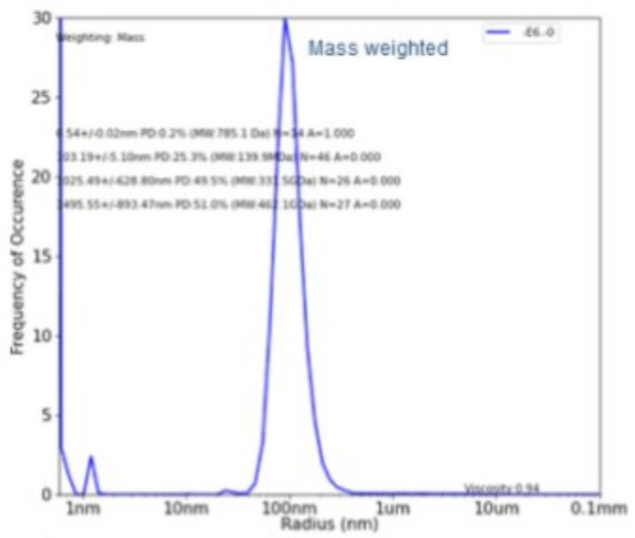
Adenoviral vector sample B: Bright light image of another sample with debris and other colloidal impurities



Control, a Mixture of three stable attenuated Viruses also incubated at Room Temperature

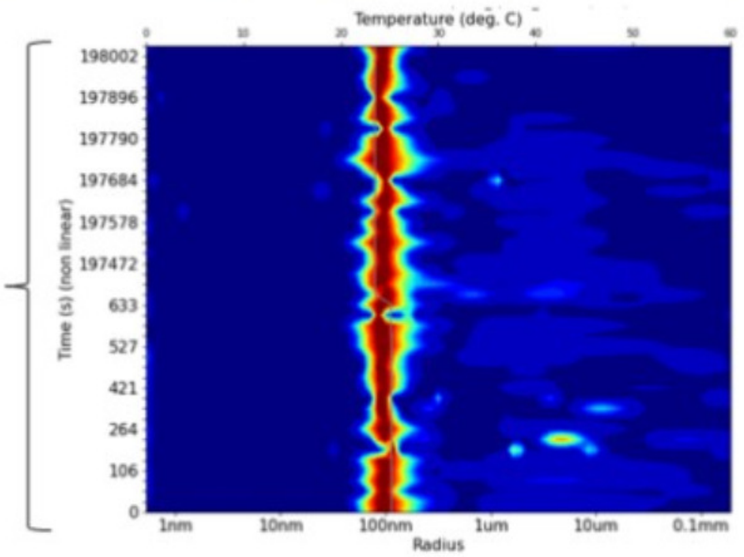
- Mumps virion ~150 nm
- Measels virion diameter ~150 nm
- German Measels virion diameter 50-70 nm

Size distribution of the 3 types mixture at t_0



3 attenuated virus types long term stability at room temperature

55 h stability check



In this plot the particle distribution is not weighted. Instead, the distribution is based on the intensity of the scattered light, which is strongly size dependent. Larger particles are therefore visible. However, their mass fraction is negligible.

Plate scanning was fully automated. The identity of smaller particle impurities was subsequently determined by other methods. They were identified as hexons and pentons as well as other capsid components such as fibres etc.

Please visit our website for more information on the incredible possibilities of in situ and in plate DLS,

Your Xtal-Concepts Team

March 7, 2025