Fidabio

360-DEGREE AUTOMATED CHARACTERIZATION OF AAVS: THE SAFE SOLUTION FOR GENE THERAPY

Morten E. Pedersen[1], Jan Goral[1], and Henrik Jensen[1]

[1] Fida Biosystems, Copenhagen (Soeborg), Denmark. www.fidabio.com, e-mail: henrik@fidabio.com

Introduction

We demonstrate how the Fida 1 can be used for full characterization of adeno-associated viruses (AAVs) for gene therapy. The Fida 1 platform only consumes

40 nL of sample for one measurement

and thus allow elaborate condition screening using very small amounts of sample material. The present work focus on quantifying critical quality parameters such as size (D_h and R_h), polydispersity index (**PDI**), **titer** (particle count) as well as **aggregate count**. The methodology is fully automated allowing screening of up to two 96 well plates under full temperature control.

Methods

The experiments were performed on a Fida 1 instrument employing 275 nm LED-UV fluorescence detection using a highsensitivity coated capillary (Fida Biosystems). 40 nL of AAV solution is consumed for one measurement point at a concentration typically greater than 1e9 particles / mL.

Fida 1

Fida 1 Consumables:
Vials and/or
96 well plates
with a HS-capillary

Results

Unbiased measurement of size, PDI, titer, and aggregates
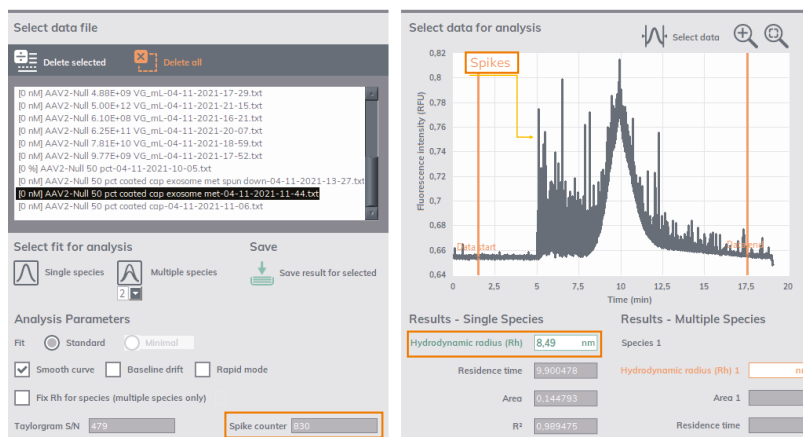
Figure 1. Size measurements, quantification of aggregates (spikes) and fluorescence intensity of an AAV2 preparation (AAV2 preparation 1).

The hydrodynamic radius (R_h) of the AAV particles was measured to be 8.5 nm (D_h=17 nm), and the Fidabio spike counter revealed 830 aggregates in the 40 nL of sample used. This demonstrate a high degree of aggregation – 2.1e7 aggregates / mL. Furthermore, the peak area is directly proportional to the AAV2 titer, thus allowing titer determination from 1e9 particles / mL.
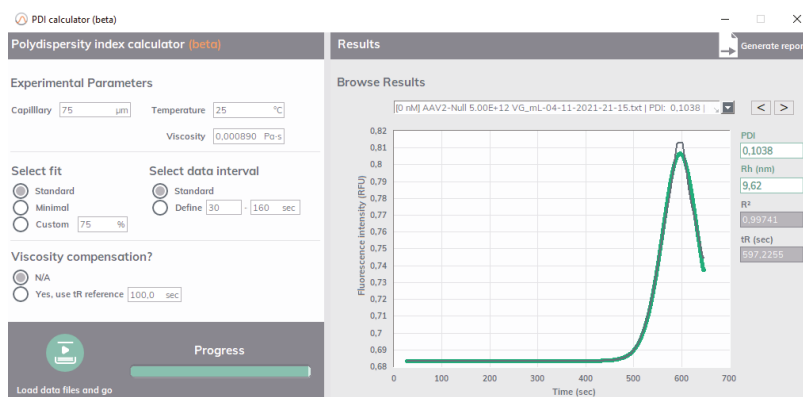
Figure 2. Fidabio PDI tool for measurement of polydispersity index of AAVs (AAV2 preparation 2).

The PDI of the AAV preparation was obtained using the new PDI calculator in the Fidabio software. For the AAV2 preparation 2, a small number of aggregates was observed and a PDI of 0.1 indicate a close to monodisperse particle population.

Conclusions

Fida 1 provides in-solution, label-free characterization of AAVs generating multiple parameters from just a few nL of sample. Its ability to determine size, polydispersity index, aggregation and titer in a single run makes it ideal for formulation screening, as well as quality control of AAV preparations.