

NanoSight LM10 Nanoparticle Analysis System

Instrument Management

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Major Features and Specifications

The NanoSight LM 10 instrument was purchased from Malvern Instruments in March 2017. This instrument utilizes Nanoparticle Tracking Analysis (NTA) to characterize nanoparticles from 10nm - 2000 nm in solution. Each particle is individually but simultaneously analyzed by direct observations of diffusion. A laser beam is passed through the particles in suspension and the particles scatter the light so that they can be visualized using a microscope which is mounted onto a video camera. This particle-by-particle methodology produces high resolution results for particle size distribution and concentration while visual validation gives users extra confidence in the data. As well as particle size and concentration (10^6 - 10^9 particles per mL), protein aggregation and viscosity can all be analyzed while a fluorescence mode provides detection of labeled particles. The instrument is used by several users in chemistry and will likely be used by other researchers in Biology, Physics, and Biomedical Engineering to characterize particulate materials.

Example of Research Use

Dr. Huang' group is one of the heavy users of this instrument. Her group works with different types of nanoparticles and vesicles that are almost impossible to analyze in terms of concentration and size without NanoSight LM 100. Her group is using NanoSight LM 100 to measure the concentration and size of exosomes and Au nanoparticles.

A general protocol to use is: 1mL of diluted exosomes or Au nanoparticles is injected, using a syringe pump, into the sample cell, then, a laser beam is passed through the sample and scatters. Using a microscope camera attached to the instrument, the scattered light help visualize the particles movement. Then we use a computer software, concentration and size of those particles are measured.

The characterization of exosomes with NanoSight LM100 has already accelerated her research in developing new assays for exosome detection and protein profiling. With the help of this instrument, her group has generated one manuscript under revision (Theoranostics. Impact factor: 8.8) and one invention disclosure (in the process). It has also helped her generate substantial amount of preliminary data that enables her to resubmit a NIH R21 proposal this November.