Successful drug product development should integrate formulation, manufacturing process, primary packaging, device and delivery to the patient. Lonza’s Drug Product Services (DPS) offering delivers a holistic approach to DP development that anticipates and prevents problems early, and ensures the result is a product that is fit for purpose.

Changing Regulations in Particle Control

Subvisible and visible particles, which are ubiquitously present in parenteral drug products (DPs), are of concern for patients due to potential safety risks; they might cause embolies or immune responses. Regulatory expectations for the control of particles in protein DPs have increased significantly over the last decade. Analysis of particles and quality control of the final DP are governed by regulatory agencies and compendial methods.

The US, European and Japanese Pharmacopeias provide some guidance on acceptance criteria for particulates in parenteral DPs. Orthogonal methods are required to monitor aggregates and particulate matter in the entire submicron, subvisible and visible size range.
Particle Quantification and Characterization

Lonza’s Drug Product Services (DPS) offers a complete panel of state-of-the-art analytical methods to quantify and characterize submicron, sub-visible and visible particles in biopharmaceutical DPs. We offer fast-track root cause investigation for particle related issues in DP manufacturing, storage and administration.

- **Submicron Particles**: we apply a variety of novel high end technologies, e.g. Nanoparticle Tracking Analysis (NTA), Resonance Mass Measurement (RMM), Light Scattering to quantify and characterize particles in the submicron range.

- **Subvisible Particles**: we use Flow Imaging Analysis [e.g. microflow imaging MFI or FlowCam] to quantify subvisible particles in solution. MFI analysis utilizes morphology and other image parameters to discriminate between particles from different sources, such as silicone oil and protein. The chemical characterization of particles posing issues in the subvisible size range, is performed by Raman spectroscopy, where particles with similar morphology and image parameters can be differentiated. Scanning electron microscopy [SEM] in combination with EDX detection provides morphological characterization and elemental analysis of particles in a broad size range.

- **Visible Particles**: we use a variety of visual inspection methods (manual as well as automated) to detect visible particles. Additionally, we can visualize particulates via [stereo] light microscopy. For identification, our Forensic Chemistry Services can isolate individual visible particles and identify them by FTIR spectroscopy, Raman spectroscopy, SEM-EDX, or mass spectroscopy.

Particle Control Strategy

Our world renowned experts provide a complete strategy for particle control in biopharmaceuticals, including the assessment of customer formulations, products and processes, as well as the selection and application of appropriate and orthogonal methods for quantification as well as characterization. We can help to design a suitable strategy for particle control, including specification setting for subvisible and visible particles, root-cause-analyses, deviations and corrective and preventive actions, to meet current health authority expectations.

Leveraging Our Experience and Expertise

Lonza DPS brings world-class expertise to bear in support of the technical as well as strategic aspects of your drug product development program. The DPS team has gained experience from multiple years of actual product development, worldwide filings and approvals, with a combined current total of more than 200 INDs/IMPDs and more than 30 BLAs/MAAs resulting in at least 25 approved products. Capitalizing on this experience allows us to go beyond a typical drug product development offering. We include key specialized services supported by a comprehensive analytical toolbox to meet increased regulatory requirements for safe and efficacious products.

DPS’s combination of unparalleled experience, a strong scientific track record, and state-of-the-art instrumental infrastructure provides industry best practices to successfully advance your drug product development programs.