



**Malvern  
Panalytical**  
a spectris company

# Analyze. Understand. Optimize.

Advanced biophysical characterization of RNA  
therapeutics and vaccines





## What's stopping your therapeutic molecules from hitting their mark?

Breakthroughs in nanotechnology and nucleic acid chemistry are reshaping treatment possibilities. But, the structural complexity and diversity of delivery vectors creates analytical complexity. So how do you make sure your therapeutic molecules hit their mark?

With a long track record of supporting pharmaceutical organizations bring successful nanomedicines to market, our suite of analytical instruments, supported by army of problem-solving scientists, can help you turn your therapeutic ambitions into commercial reality.

Our unique toolkit of advance biophysical characterization tools helps you understand the structure, stability and affinity of your nanodrug delivery systems. We can help you help strengthen your analytical workflows and innovate faster than your competition.

From discovery to quality control, we can help you apply the right solutions to ensure your treatments reach their full potential.

**Together, we can make the impossible, possible.**

*"Our collaboration with Malvern Panalytical will help us to work even better on our ongoing and future projects to achieve stability improvements for a range of vaccines."*

**Dr. Andreas Seidl,**  
Chief Operating Officer at Leukocare



## Are you struggling with the following challenges?

### Structure & efficacy

- How is the structure of my vector affected by processing and environmental stresses?
- Is my vector the right size to enter the target cell?

### Stability

- Will my vector protect the payload from degradation and reach its target?
- How can I minimize degradation of my formulation during processing & storage?
- How do changes in temperature & pH affect my sample's stability?

Malvern Panalytical has the analytical tools you need to help you understand the critical quality attributes and critical process parameters.

*"Our highly specialized scientific team found Malvern Panalytical's Zetasizer DLS a key tool in Polymun's analytical workflow".*

**Andreas Wagner,**  
Head of Liposome Technology at  
Polymun Scientific





# What can you do with Malvern Panalytical's biophysical characterization tools

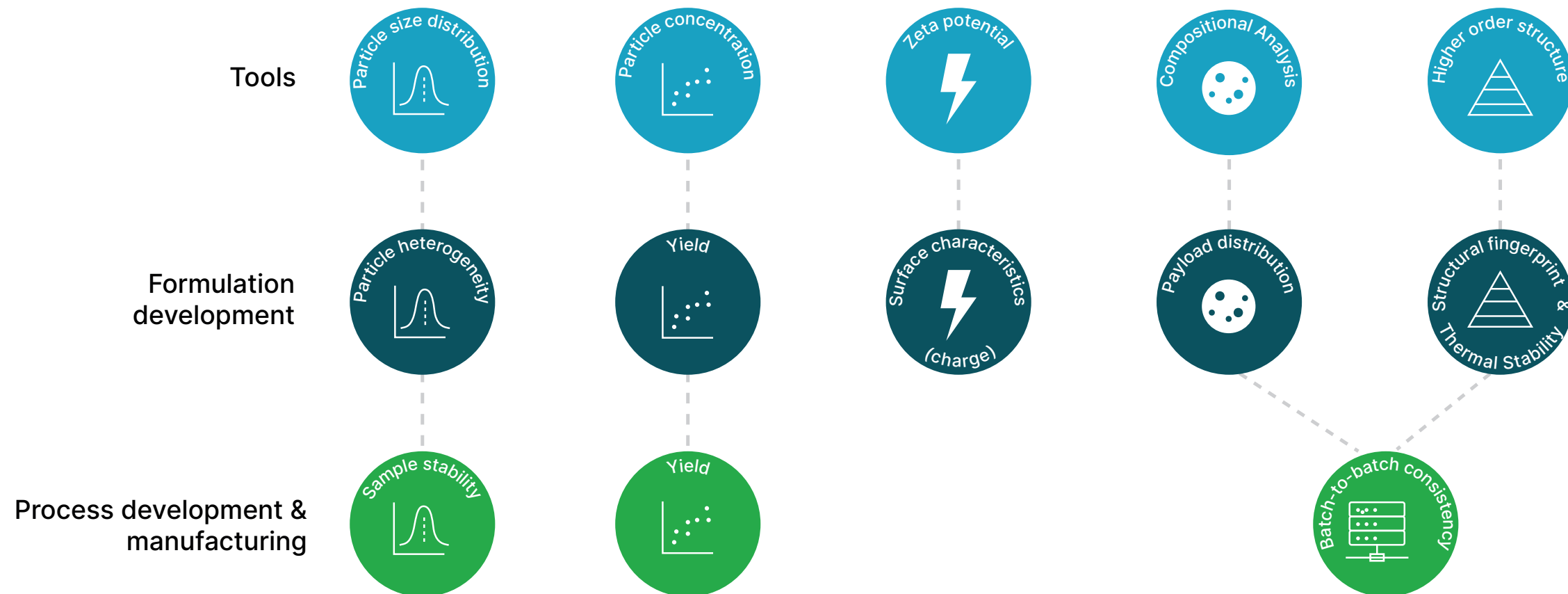
You can use our biophysical characterization tools to help you characterize and optimize your LNP vectors during formulation development and process development & manufacturing.

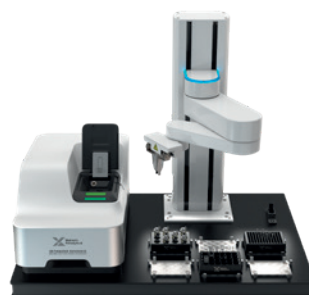


"The Malvern Panalytical PEAQ-DSC instrument has become an invaluable tool in our labs for mRNA and lipid nanoparticle characterization. [...] The DSC data does not only allow us a better understanding of our drug substance and drug product regarding secondary structures of mRNA, batch to batch comparison, but also getting an insight in structural changes of lipid nanoparticles during for example freeze-thaw cycles and stability studies.

Dr. Markus Kramer,  
Senior Scientist, Analytical Development at CureVac

Biophysical characterization tools to answer questions during formulation development and process development & manufacturing.





### Sample stability

### Sample homogeneity

### Sample concentration

Product	PEAQ DSC	Zetasizer Range	NanoSight Pro	OMNISEC Reveal	Product
<b>Measurement</b>	<ul style="list-style-type: none"> <li>Higher order structure</li> <li>Thermal stability</li> <li>Thermal transitions</li> </ul>	<ul style="list-style-type: none"> <li>Particle size</li> <li>Particle concentration</li> <li>Polydispersity</li> <li>Zeta potential</li> </ul>	<ul style="list-style-type: none"> <li>Particle size</li> <li>Particle concentration</li> <li>Polydispersity</li> <li>Fluorescence detection</li> </ul>	<ul style="list-style-type: none"> <li>Polydispersity</li> <li>Therapeutic payload</li> <li>Weight fraction of payload</li> </ul>	<b>Measurement</b>
<b>Technology</b>	<ul style="list-style-type: none"> <li>Differential Scanning Calorimetry (DSC)</li> </ul>	<ul style="list-style-type: none"> <li>Dynamic Light Scattering (DLS)</li> <li>Multiangle Dynamic Light Scattering (MADLS)</li> <li>Electrophoretic Light Scattering (ELS)</li> <li>Static Light Scattering (SLS)</li> </ul>	<ul style="list-style-type: none"> <li>Nanoparticle Tracking Analysis (NTA)</li> </ul>	<ul style="list-style-type: none"> <li>Size Exclusion Chromatography (SEC)</li> </ul>	<b>Technology</b>
<b>Accessible size range</b>	n/a	<1 nm to 10 µm*	30-1000 nm	<200 nm**	<b>Accessible size range</b>
<b>Accessible concentration range</b>	0.01 to 10s mg/ml - sample dependant	From 10 <sup>8</sup> – 10 <sup>13</sup> particles/mL	~10 <sup>7</sup> – 10 <sup>9</sup> particles/mL	Range limited by RI/UV detectors	<b>Accessible concentration range</b>
<b>How much sample is required</b>	325 µL	~20 µl	0.25-1 ml	20 µL - 100 µL	<b>How much sample is required</b>
<b>How can it help me?</b>	<ul style="list-style-type: none"> <li>Identify optimal conditions for structural stability during formulation, processing, &amp; storage</li> <li>Reliably assess batch-to-batch comparability</li> <li>Inform design and selection of nucleic acid variants</li> <li>Perform automated, hands-free measurements and maintenance - enabled by dedicated built-in cleaning procedures</li> </ul>	<ul style="list-style-type: none"> <li>Utilize particle size data to determine tissue penetration and sample stability of LNP vectors</li> <li>Measure concentration to quickly detect small changes in sample yield</li> <li>Analyze vector polydispersity to gain insights into sample stability and process reproducibility</li> <li>Assess particle charge to evaluate colloidal stability and predict cellular membrane interactions</li> <li>Operate hands-free with the Zetasizer Sample Assistant</li> </ul>	<ul style="list-style-type: none"> <li>Gain deep insights into sample heterogeneity with high-resolution particle size distribution measurements</li> <li>Quickly detect changes in sample stability and yield with particle concentration measurements</li> <li>Use specific fluorescence detection to identify sample components, including cargo</li> </ul>	<ul style="list-style-type: none"> <li>Accurately determine the weight fraction of genetic payload in samples without dedicated reagents or reference standards</li> <li>Check to see if RNA is aggregated/fragmented</li> </ul>	<b>How can it help me?</b>

\* Zetasizer Advance Ultra

\*\* Determined by what can be separated on a column



## About Malvern Panalytical

We draw on the power of our analytical instruments and services to make the invisible visible and the impossible possible.

Through the chemical, physical and structural analysis of materials, our high precision analytical systems and top-notch services support our customers in creating a better world. We help them improve everything from the energies that power us and the materials we build with, to the medicines that cure us and the foods we enjoy.

We partner with many of the world's biggest companies, universities and research organizations. They value us not only for the power of our solutions, but also for the depth of our expertise, collaboration and integrity.

We are committed to Net Zero in our own operations by 2030 and in our total value chain by 2040. This is woven into the fabric of our business, and we help our employees and customers think about their part in creating a healthier, cleaner, and more productive world.

With over 2300 employees, we serve the world, and we are part of Spectris plc, the world-leading precision measurement group.

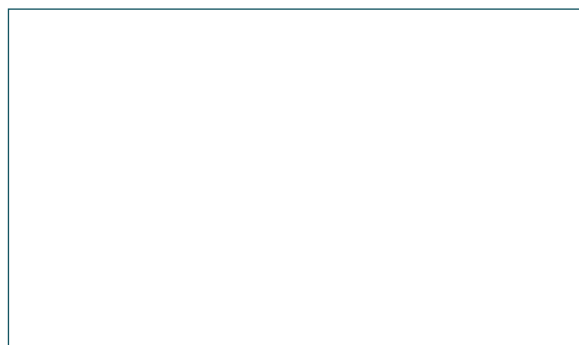
**Malvern Panalytical. We're BIG on small™**

## Service & Support

Malvern Panalytical provides the global training, service and support you need to continuously drive your analytical processes at the highest level. We help you increase the return on your investment with us, and ensure that as your laboratory and analytical needs grow, we are there to support you.

Our worldwide team of specialists adds value to your business processes by ensuring applications expertise, rapid response and maximum instrument uptime.

- Local and remote support
- Full and flexible range of support agreements
- Compliance and validation support
- Onsite or classroom-based training courses
- e-Learning training courses and web seminars
- Sample and application consultancy



## Malvern Panalytical

Groveswood Road, Malvern,  
Worcestershire, WR14 1XZ,  
United Kingdom

Tel. +44 1684 892456  
Fax. +44 1684 892789

Lelyweg 1,  
7602 EA Almelo,  
The Netherlands

Tel. +31 546 534 444  
Fax. +31 546 534 598

[www.malvernpanalytical.com](http://www.malvernpanalytical.com)