Particle Works

Automated Library Synthesis (ALiS) System

particle-works.com

Speed up your discoveries with the Automated Library Synthesis (ALiS) System

The Automated Library Synthesis (ALiS) System enables high-throughput screening of nanoparticle formulations and mRNA candidates in early-stage development.

This platform significantly accelerates screening projects by performing up to 96 experiments in a typical working day. ALiS provides full walk-away automation of complex protocols, allowing you to focus on other tasks in the lab. The system also lets you work with as little as 100 µl of reagent per experiment with flexible control over collection volumes to maximise your precious materials.

High-throughput
Aspirate from and dispense in to sealed/ covered 96 well plates.

Automation
Walk away during experiments increasing laboratory efficiency.

Covered 96 Well Plates
Reduce evaporation and cross-contamination.

Anti-dispersion Technology
Work with smaller reagent volumes.

Speed
Process up to 96 samples in a typical working day.

Flexibility
Modify both process parameters and formulations for each experiment.

Cost Saving
Reduced reagent use and reusable chips.

Scalability
Scale seamlessly to process & protocol optimization.

Precision & Encapsulation Efficiency
Accurate control, excellent PDI and encapsulation efficiency.

We've seen what's possible when brilliant minds come together to focus and find the answers. You continue to inspire us with the incredible work you're doing and we champion your commitment to push the boundaries of science.

We care deeply about the revolutionary change our technology can bring and the powerful impact it will have. Let's shape the big picture together, one particle at a time.

System overview

In recent years, microfluidics has come to the forefront of nanoparticle synthesis for drug delivery and gene therapy. Current systems used for screening require manual changing of formulations, and lack the automation required to process large number of samples quickly. Welcome to a new era of high-throughput and automated screening: ALiS.

ALiS is a new generation of screening platforms, and the first to deliver automation and high-throughput screening for the synthesis of nanoparticles such as mRNA-LNPs. Based on microfluidics, and using anti-dispersion technology, ALiS will significantly accelerate the discovery of ideal drug development candidates, enabling you to process countless experimental possibilities and find your lead candidates quickly.

You can process up to 96 unique formulations in a typical working day, aspirating from and dispensing into covered 96 well plates. You have the option to vary both formulations (such as lipid ratios, or reagent concentrations), and process parameters (such as total flow rate or flow rate ratio) between each well.

The platform incorporates our precision-engineered microfluidic technology, and Anti-dispersion Technology, and utilizes our in-house designed and fabricated, reusable microfluidic chips for controlled convergence of fluids within the pathway.

System modules

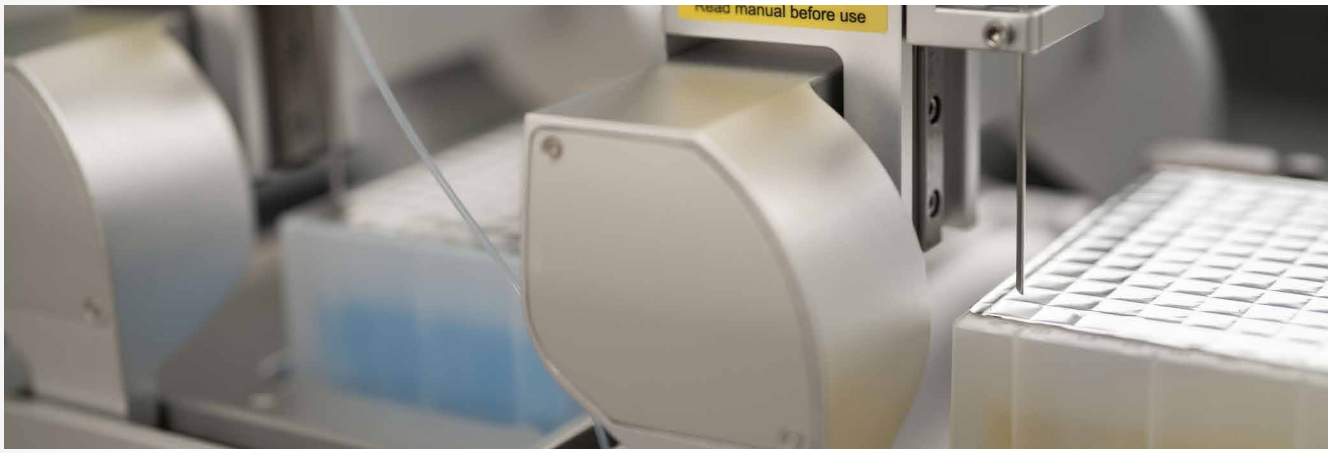
- **Quad Pump** – automated two-channel syringe pumps designed to aspirate reagents from well plates, drive fluids through the system flow-path, and dispense collected nanoparticle samples. Each of the three Fluid Handlers requires a Quad Pump in order to function.
- **Fluid Handler** – pairs with a Quad Pump to aspirate/dispense fluid from/to a range of locations, and houses the distribution valves and sample loop that allow reagents/nanoparticle samples to be stored and transferred during an experiment.
- **Fluid Store**– houses the driving fluids required to move reagents and samples through the ALiS System flowpath, as well as the waste fluids generated by the system. On the front of the Fluid Store is the chip mounting rail used to position the chip between the input Fluid Handlers and the collection Fluid Handler.

System features

Particle size	40 nm to 800 nm
Particle monodispersity	PDI <0.2*
Sample volume	100 µl to 2 ml per experiment
Speed	Up to 96 experiments in 6 hours*
Encapsulation Efficiency	Up to 98%

*Dependent on formulation.

Accelerate your LNP Formulation screening with ALiS



High-throughput & flexibility

ALiS significantly accelerates your screening process, allowing you to find more potential candidates in a shorter timeframe, with a more efficient use of precious lipids, reagents and cargo. The platform gives you the flexibility to change both the formulation between wells, and process parameters between each experiment, as well as the ability to pause the system to collect product samples mid-run.

This is ground-breaking technology for scientists in this field, and, coupled with accurate control, high encapsulation efficiency and consistent performance day to day, it makes execution of experimental design a breeze. We hope it will become the screening platform of choice for scientists during the discovery phase.

Automation & speed

The days of labour-intensive work to find suitable formulation candidates are over. With ALiS, there is little to no manual intervention required - ALiS automates your mRNA-LNP formulation screening for you.

Aspirating samples from well plates containing pre-prepared mRNA and lipid formulations, ALiS will collect up to 96 nanoparticle samples in a single run, with no human interference - all in less than a day. The user can define and validate the experimental parameters at their desk and set ALiS running at the click of a button, leaving researchers free to get on with other important tasks in the lab.

Reduced time, labor & cost

With its ability to prepare up to 96 samples in a typical working day, ALiS will significantly reduce the time investment for researchers, meaning you can do many more experiments in the same amount of time, or use the time you have saved to work on other projects.

Additionally, running costs are lowered. Reagent costs are reduced thanks to ALiS working with lower sample volumes – requiring as little as 100 ul of input reagent – and the specially developed Anti-dispersion Technology ensures more efficient use of precious cargo. Particle Works' microfluidic chips are robust and re-usable, helping to reduce your consumable costs.

Sample integrity & precision

Preserving sample integrity is crucial. ALiS uses covered 96 well plates and automated washing of the needles and system flow path between experiments, meaning that evaporation of reagents is minimized and cross-contamination is eliminated. And with our Anti-dispersion Technology, you can achieve consistent results with even smaller volumes of reagent.

As you would expect with a Particle Works platform, ALiS enables unrivalled control over the nanoparticle screening process. Our technology enables users to achieve the best monodispersity, PDI, encapsulation efficiency and consistency from their formulations during automated screening, with a range of microfluidic chips to suit your application.

Continuity for your seamless drug discovery journey

Continuity is another key feature of the Particle Works product range. ALiS is the first in a range of platforms which allows you to transfer from discovery, through development to manufacturing using the same process technology. Using the same microfluidic chips and pumping technology at every stage of nanoparticle development ensures your formulations are transferrable and scalable right through to the manufacturing stage. By starting your screening with ALiS, Particle Works has you covered for the rest of your development journey.

Rooted in microfluidics

Particle Works was created from Dolomite Microfluidics (part of Blacktrace Holdings Ltd), where we've been at the forefront of microfluidics and working with particles for nearly two decades. We've listened to our customers and launched a dedicated particles brand, designing and building game-changing particle engineering platforms which will allow you to produce nanoparticles with unrivalled precision, consistency, and control, whilst reducing your development time and cost.

What makes us unique is our combined capabilities: a strong history of particle engineering, scientific knowledge, microfluidic expertise, and in-house chip design and fabrication. We also offer a proof of principle service, offering you the opportunity to test your protocol and materials prior to purchase.

We pave the way for particle perfection - delivering unrivalled accuracy, quality, consistency, and efficiency: from our technology and custom studies to our customer support.

Advantages of microfluidics

Continuous flow processes provide a small and consistent reaction window as fluids converge precisely providing:

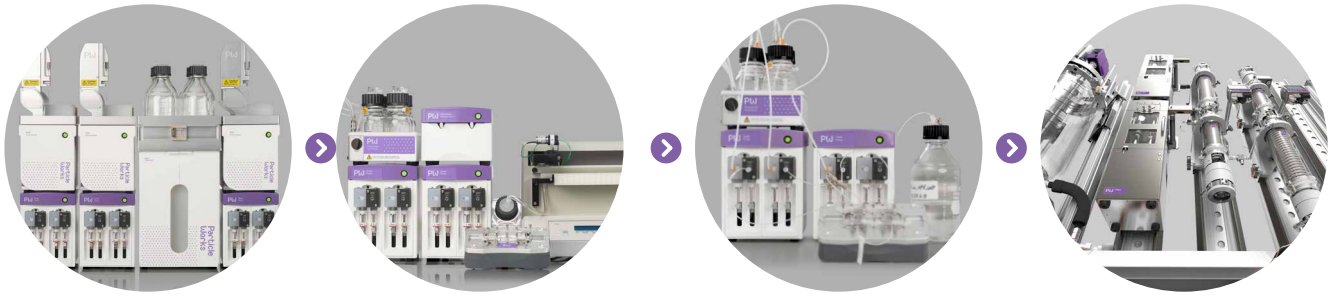
- Unparalleled consistency of particle size and monodispersity.
- Higher encapsulation efficiency with controlled payload release.
- Higher reproducibility and linearly scalable processes.
- Lower sample volumes and reduced waste, ideal for screening and development.
- Avoids particle damage caused by mechanical mixing.
- Faster, easier to optimize protocols.
- Scalability – produce µl to liters with the same chip.

Engineering a future worth experimenting for together

As we look to the future, we have more exciting platforms in our product pipeline that will take you all the way from formulation screening, and protocol development to GMP scale-up and large-scale production.

Let's zoom in to make big change, one particle at a time.

Your pathway to particle perfection



Screening | Protocol development | Initial scale-up | Production

Contact us

info@particle-works.com
particle-works.com

If you are interested in what we do, please do come and talk to one of the experts in our team. We'd love to tell you more about our technology, and demonstrate how you can revolutionize your workflow.