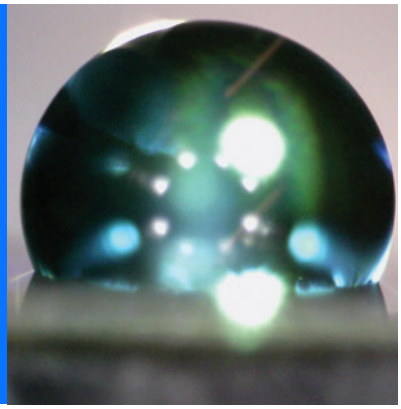
MEDICAL

Microfluidics for In Vitro Diagnostics

sagentia

- Central lab & PoC systems
- Translation from research into development
- Consumables & instrumentation



Trends in microfluidics

Microfluidic approaches enable diagnostics of small sample volumes, help to simplify sample preparation and support mutiplexed assays. Microfluidics sees use in clinical assays, immunoassays, molecular assays and sequencing. The benefits are pronounced in Point of Care where cost, simplicity and size are extremely important. Lab-on-chip devices, demonstrated in the lab, will move into clinical use as the cost and reliability challenges are overcome. This shift will challenge the established centralised lab model.

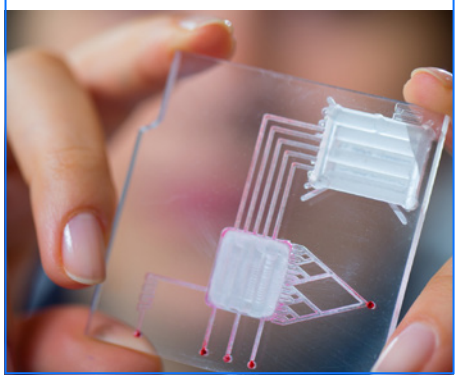
Sagentia in microfluidics

Sagentia develops microfluidic consumables and instrumentation for research and clinical use. Our work spans technology creation and feasibility investigation, design, prototyping and transfer to manufacture.

Working in partnership with universities, IVD companies and manufacturers we deliver new technologies with improvements in throughput, sensitivity, sample volumes and consumable cost.

Sagentia capabilities

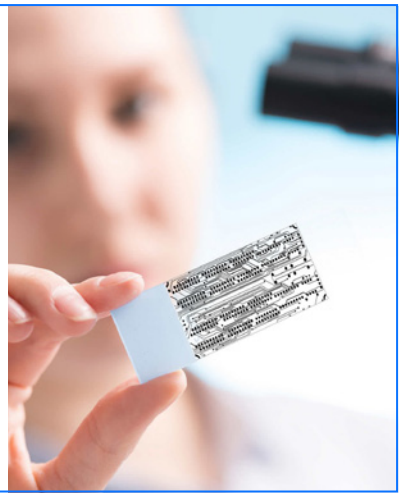
- Capillary, electrowetting, dielectrophoresis & pneumatic delivery
- Surface chemistries & coatings
- Integration of assay chemistries & reagent storage
- Sensor technologies: optical, imaging, electrochemistry, magnetics
- Instrumentation & interface to consumable



At Sagentia, we work across the development lifecycle:-

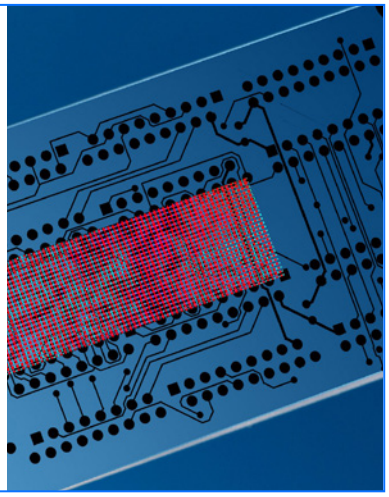
initial need and market analysis → concept generation → technology and product development → transfer to manufacture

Re-design of medical diagnostic consumable



Full case study overleaf →

Scaling up a novel microfluidic process



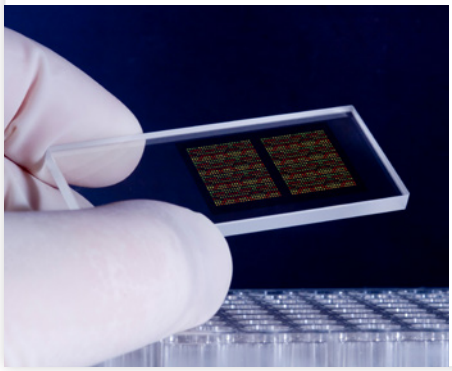
Full case study overleaf →

Re-design of medical diagnostic consumable

Simplify assembly, reduce production costs and improve function

Challenge ¬

To increase repeatability of its fluid motions a market-leading diagnostic consumable needed a re-design. Due to cost no surface treatments could be considered on this moulded part so microfluidic design techniques were required.



Approach ¬

After defining the sequence of fluid motions required within the device, we developed a COMSOL model, tested this with prototype parts and generated a design which is now in tooling. Specific functions achieved were:

- Required blood sample accurately metered with tolerance of +/- 1µl
- Known volume of water wicked through capillary network within a set time
- Repeatable pattern of 5µl air bubbles generated

The new design created a marked reduction in part count, production cost and greatly simplified assembly

Benefit ¬

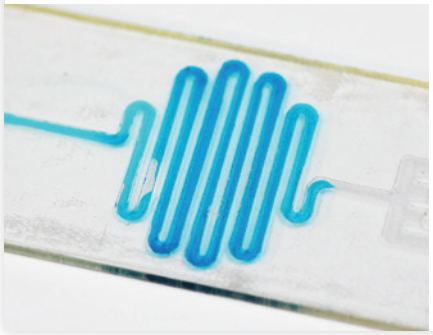
- The new design created a marked reduction in part count, production cost and greatly simplified assembly
- Diagnostic precision increased through reduced variability of fluid motion

Scaling up a novel microfluidic process

Successfully transitioning from research to full scale production

Challenge ¬

Our client had developed a novel microfluidic process for encapsulating peptide and protein generics in spheres to enable controlled release of a drug. Complex physics issues were a barrier to successful scale-up.

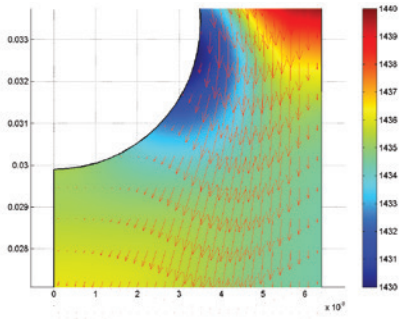


Approach ¬

We analysed the issues from a number of angles

- We identified the key parameters that lead to successful production of spheres
- We identified new device designs that eliminated geometries where fluidic problems can occur
- We developed a mathematical model to predict the sensitivity of a scaled-up, parallel process to manufacturing tolerances

This resulted in seven recommendations to guide the development process



Benefit ¬

- This was a short and sharply focused piece of work to help our client surmount a critical obstacle
- They have now secured £2 million in funding, which will enable them to develop the scaled-up process

Contact us

The above are just two examples of our work in microfluidics. For more information, please email us at info@sagentia.com or visit us at www.sagentia.com.