

# Integrated knowhow

**Cell separation has become instrumental in many areas of medical research over the last two decades, and Miltenyi Biotec's MACS® Technology has become the gold standard technique, having been cited in over 20,000 publications. Combining superparamagnetic microparticles conjugated to specific antibodies with proprietary columns, this technology uses strong magnetic fields to separate specific cell types, allowing retention of both labeled and unlabeled cells for downstream analysis.**

Miltenyi Biotec has been helping to advance biomedical research and cellular therapies since 1989, providing equipment and instrumentation based on its core MACS Technology. Founded and headquartered in Bergisch Gladbach near Cologne, Germany, the company now offers solutions to cover the entire cell processing workflow. Miltenyi Biotec provides cell biology equipment to both academia and industry, and its technology is used for fundamental research, pre-diagnostics and in clinical settings. Lotta Rätty, Global Product Manager for Cell Separation Instruments at Miltenyi Biotec, outlined the company's

approach: "Cell separation is probably the technology that we are best known for, but we aim to provide our customers with a one-stop shop for everything to do with cells – from sample preparation through cell separation using our MACS Technology to analysis, as well as cell culturing."

Miltenyi Biotec has partnered with Tecan to develop a high throughput cell separation system, the MultiMACS™ X. Lotta explained the history of the partnership: "We started working with Tecan a number of years ago, when we first identified the market for integrated

systems offering high throughput, more automated cell separation. Our MultiMACS Cell Separation System is available as a standalone instrument, but the possibility of integrating it with a liquid handling platform was considered from its inception. Prior to the development of the MultiMACS X, customers looking for a higher throughput set-up needed to combine our instrument with their own liquid handling system. However, this is a complex undertaking, and requires a large investment of time and manpower to ensure an optimal workflow and achieve the desired biological results."



Lotta Rätty demonstrates the MultiMACS X cell separation system

“Ultimately, you’re going to have far more dependable results with automation.”



The MultiMACS X combines Miltenyi’s and Tecan’s expertise to offer high throughput cell separation

“Customers expect speed, high throughput and quality results from our systems, and so they don’t want to have to invest their time doing this optimization and validation. It was therefore a logical next step for us to do this on behalf of our customers and create a fully-integrated platform. When we set about designing the MultiMACS X, we decided that combining our instrument with a Tecan Freedom EVO® 100 liquid handling workstation was the best choice, bringing together two systems that are well established in the marketplace. But it’s about more than simply integrating our instrument into a liquid handling system. This blend of our cell biology knowhow and Tecan’s liquid handling and automation expertise enables us to offer a complete, validated solution, removing the onus of equipment assembly and workflow optimization from the customer.”

As well as providing a fully validated hardware solution, Miltenyi Biotec also tailors the software and workflow to meet individual customers’ specific needs. Lotta continued: “There are multiple steps to be considered in any cell-based workflow; dispensing of samples, reagents and buffers,

incubation steps, the logistics of moving labware around the workdeck, and keeping track of all the samples. One customer may want to have an additional washing step, or separate several different cell types from one sample, or use a different starting material, and so on. There are multiple interdependent processes, and so the challenge is to establish a workflow that produces the optimal final result. This is something specific to each customer, and we don’t leave their lab until they are happy with the system performance, which is something that they really appreciate.”

“The MultiMACS X with the Multi-24 Column Block allows the separation of up to 24 samples in parallel. This can be numerous different samples or, for very large sample volumes, multiple aliquots of the same sample. The system takes approximately 45 minutes to process 24 samples, including loading and unloading the instrument, whereas processing that many samples manually could take three to five hours. But it isn’t just the total time that should be considered, you also need to factor in how much hands-on time is involved; processing 24 samples manually requires the technician to sit at the bench for the

entire time whereas, with the MultiMACS X, it takes five minutes to load, another five minutes to unload, and that’s it.”

“Another major benefit of automation is the reproducibility that can be achieved. This should be a consideration when using any set-up, and reducing the number of hands-on steps minimizes the risk of human errors, lowering the overall variability of your experiment. Ultimately, you’re going to have far more dependable results with automation, and partnering with Tecan has allowed us to meet the needs of these higher throughput applications while maintaining the quality our customers expect,” Lotta concluded.

**To find out more about partnering with Tecan, visit [partnering.tecan.com](http://partnering.tecan.com)**

**To learn more about Miltenyi Biotec’s MultiMACS X, go to [www.miltenyibiotec.com/multimacsx](http://www.miltenyibiotec.com/multimacsx)**