

TOPICS



**Adopting 6-axis robots for automation of regenerative medicine and drug development equipment**

Micronix displayed its drug development and regenerative medicine robotic system at an international biotechnology exhibition (BIO tech 2016), Interphex Japan 2016, and at another exhibition held in conjunction with the 15th Congress of the Japanese Society for Regenerative Medicine. The main focus of the display was “venturing into regenerative medicine” with the catchphrase “Send our technological power to the world, The goods good from a good idea”. The system on display included a 6-axis robot (Denso Wave Incorporated) that performed a series of tasks in conjunction with products developed by Micronix, such as a high-speed microplate auto sealer, small microplate centrifuge, tube arrangement system and a high speed dispenser. The robot can work 24/7 with the same fluid movement as an experienced human technician. This system is already in operation at a number of pharmaceutical manufacturers.

**Automating manual operations such as tube opening, pipetting and so on to support research activities.**



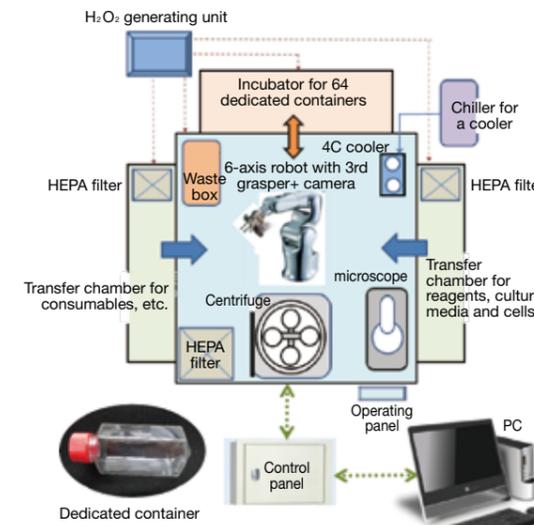
**Examples of robotics technology applications to regenerative medicine and drug development equipment**

In the field of regenerative medicine, the following operations are carried out in isolators (sterile environment): culture, observation, culture medium replacement, cell recovery, centrifuging, transfer-in/out of consumables, low-temperature storage, dispensing and agitation. Six-axis robots and other units must be able to withstand exposure to hydrogen peroxide during the decontamination process. Furthermore, 6-axis robots are also used in continuous microplate culture systems and -150C LN2 auto storage systems that are used in safety cabinets and clean rooms. Automation of opening/closing of the lids of LN2 storage tanks used for long-term storage of cells, etc., transfer-in/out of samples, picking up and other operations with 6-axis robots can simplify operations, help to avoid sample containers from becoming mixed up, ensure the safety of workers (prevent freezing, lack of oxygen), reduce working hours, and prevent an increase in the temperature of samples.

FACT SHEET

**RS-03 Compact Automated Cell Culture System**

**Fully automated cell culture system**



**Technology overview**

Micronix has succeeded in creating a smaller, cost-effective automated cell culture system. The smaller size and greater efficiency essential for clinical applications and practical everyday use in regenerative medicine were achieved with a 6-axis robot with sub-fingers and camera that can be decontaminated. It is a fully automated system that can perform all cell culture processes (seeding, culture, culture medium replacement, reagent dispensing, agitation, cell observation, centrifuging and cell recovery). Sub-fingers were added so that all processes could be performed with a single robot. The sub-fingers are fitted above the parallel opening grippers used for holding flasks, etc. and can be used to pull or push syringe cylinders or pipettes that are being held by the gripper. The robot's exterior is made of aluminum and coated to make it hydrogen peroxide resistant.

**Feature 1**

All culture processes can be performed with a single 6-axis robot fitted with sub-fingers.

**Feature 2**

Materials needed for long-term cultures can be brought in through the transfer chambers on either side of the robot.

\*2015: A New Energy and Industrial Technology Development Organization (NEDO) technological development project for commercial robot utilization

**Development background**

Animal Stem Cell Co., Ltd. and Denso Wave Incorporated filed an application for inclusion in the project sponsored by the New Energy and Industrial Technology Development Organization (NEDO) referred to as the “technological development project for commercial robot utilization.” The company was subsequently selected to develop a backyard regenerative medicine robotics system. Since the system incorporates both automation technology and the basic functions essential for cell culture (dispensing, agitation, centrifuging, cell culture, culture medium replacement and cell recovery), Micronix Inc. participated as a sub-contractor in the development project undertaken by these companies and proposed a system in which a single robot performs all cell culture processes.

**Uniqueness**

Using proprietary 8-sided containers, Micronix was successful in creating a smaller, cost-effective automated cell culture system; the first of its kind in Japan. This system allows full automation of all cell culture processes. All culture processes can be performed smoothly with a single 6-axis robot. Materials needed for long-term cultures can be brought in through the transfer chambers on either side of the robot. The system is now being operated on a trial basis, following which improvements will be made to the hardware and the software to further enhance the unique features of the system.

**The outlook for the future**

This system contains numerous technological elements that are aligned with the Japanese government's ongoing drive to advance regenerative medicine and robotic technology. Experience is currently being acquired through practical application in the field animal regenerative medicine. Medical universities and pharmaceutical companies are also making progress in studies on automated systems for drug development using iPS cells. The company is moving ahead with development and practical trials utilizing the limited space and resources available in Japan, with the ultimate objective of making a compact total regenerative medicine system available in hospitals.

**Company history**

- 1981 Micronix Research Center established at 66 Ichinotsubo, Makishima-cho, Uji, Kyoto
- 1983 Incorporated and renamed Micronix Inc.
- 1984 Head office moved to 11-41 Makishima-cho, Uji
- 1985 Capital increased to 12 million yen.
- 1989 Acquires medical equipment manufacturer and sales company
- 2006 Wins Kyoto Small and Medium Enterprise Technology Grand Prix Best Technology Award
- 2007 Acquires Class II medical devices manufacturing and marketing authorization
- 2009 Exhibits products at LAL in California and at the exhibition held in conjunction with the annual conference of the Society of Biomolecular Sciences in Arizona, U.S.A for the third consecutive year
- 2010 Head office moved to 24-1 Shin-arami, Tai, Kumiyama Town, Kyoto
- 2011 “Development of urine cytology analyzer” adopted as a Japanese government “Supporting Industry” project
- 2015 “Market launch of urine flow meter” adopted as a METI-sponsored project entitled “Development of Medical Devices through Collaboration between Medicine and Industry”

**Company Profile – Key information (as of August 2016)**

Location	24-1 Shin-arami, Tai, Kumiyama Town, Kyoto, 613-0036
URL	http://www.micronix.co.jp
TEL	0774-46-8303
FAX	0774-41-2771
No. of employees	50 (as at August 2016)
Capital	12 million JPY
Established	1983 (started operations in 1981)
Representative	President and Representative Director, Yoshiaki Yagi

**Business areas**

An integrated, R&D-oriented manufacturer involved in every stage of the process from design, manufacture, and sales through to maintenance of special-purpose and other equipment, focusing on regenerative medicine, drug development, environmental monitoring and pre-analysis processing systems, and OEM (outsourced product) equipment.