



Image supplied by Lifeline Cell Technology

# Peering into popular cultures

In the quest for knowledge that can be used to improve and maintain optimal health, the dependence on tissue and cell culture has never been more critical. As such, dedicated tissue and cell culture products have evolved to ensure the best conditions for growing, handling or manipulating cultures. For increased convenience, some manufacturers can even provide the culture strain so you can focus on harvesting the data they provide. The companies listed below provide tissue and cell culture products to aid in your research.

## Equipment

**Nikon Instruments** has developed two instruments specifically geared for the cultivation of live cells. The **BioStation CT** is a self-contained system for managing, observing and recording cell growth, morphology, and protein expression in culture by providing consistent environmental control of temperature, humidity and gas concentration. The **BioStation IM** is a compact cell incubation and monitoring device that allows users with minimal microscopy experience to conduct live cell imaging locally or by remote operation over a public or private network.

Four new additions to **New Brunswick Scientific's** line of direct-heat CO<sub>2</sub> incubators increase usable chamber space, minimize contamination risk and make cleaning convenient and rapid. Chamber sizes fit the needs of any laboratory: the personal-sized **Innova® CO-48** has a 1.7 cu. ft. chamber, while the micro-sized **CO-14** has 0.5 cu. ft., especially suited for sample isolation. The **Innova CO-170** and **Excella ECO-170** both offer 6 cu. ft. chambers, and each has additional specialized functionality for widespread versatility. A fanless design and seamless chamber provide effortless cleaning without risk of contamination. Six-sided convection heating supplies even temperature and humidity levels, and dry walls for an optimal culture environment. HEPA-filtered CO<sub>2</sub> inlets and infrared (IR) CO<sub>2</sub> sensors provide safety with superior accuracy and stability.

Culture efficiency is enhanced with the multi-functional **Enviro-Genie® Benchtop Refrigerated Incubator** from **Scientific Industries**. A Peltier driven temperature-controlled chamber and variable speed magnetic rocking platform provide ample conditions for many cultures, and the platform can be easily interchanged to rolling mode for use with roller bottles. The platform can also be removed for use with

spinner flasks, which are controlled by integrated magnetic stirrers. The **Enviro-Genie** can also be used as a personal refrigerator to chill and store media and supplements at the research bench.

The novel **Wave Bioreactor®** from **GE Healthcare Bioscience BioProcess Corporation** (formerly **Wave Biotech**) is a completely closed cell culture system consisting of a presterilized, disposable **Cellbag®** chamber that, once filled with culture medium and cells, is placed on a specialized rocking platform. The distinctive wave produced via this platform provides gentle mixing and effective oxygen transfer even for cell growth greater than 10 x 10<sup>6</sup> cells/ml. As the media and cells are completely contained within the single-use Cellbag chamber, cross-contamination, cleaning and sterilization issues are non-existent. The Wave Bioreactor pneumatic system can be used inside an incubator for simple temperature and pH control, or as a standalone unit with optional internal CO<sub>2</sub>, O<sub>2</sub>, temperature, weight, and pH controls, dissolved oxygen monitoring, and data acquisition. The complete system is available in sizes to accommodate from 0.1 to 500 liters of culture volume, and any type of cell culture can be performed, even microcarrier cultures and high-density cultures.

## Media, Supplements & Cells

To dramatically boost cell growth in mammalian tissue culture experiments, **Athena Enzyme Systems** has formulated the **FNC Coating Mix®** reagent. Cell culture flasks or microplates are pre-coated with this exclusive formula to achieve maximum cell attachment, which encourages growth of adherent cell lines. Fastidious cell types such as human prostate and breast epithelial cells attach and grow more effectively on plastic surfaces coated with FNC Coating Mix rather than non-coated surfaces when cultured in the appropriate serum-free

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medium.

**Sigma-Aldrich's** serum-free stem cell medium, the **Stemline™ Neural Stem Cell Expansion Medium**, provides superior neurosphere as well as monolayer NSC expansion. "Stemline Neural Stem Cell Expansion Medium is the first that will specifically support research in the area of neurodegenerative diseases such as ALS (Lou Gehrig's Disease)," notes Lisa Masterson, Cell Culture Product Manager at Sigma-Aldrich. The medium offers high neural stem cell yield in a serum-free environment to reduce variability and safety risks associated with adventitious agents in serum. The formulation requires only supplementation with growth factor materials appropriate for each laboratory's stem cell needs to achieve a healthy, high-density neural stem cell population that maintains differentiative capacity.

**Invitrogen** has engineered an optimal medium for growth of normal and immortalized human mammary epithelial cells with consistent gene expression profiles. **GIBCO® HuMEC Serum-Free Medium** contains known levels of proteins, growth factors and other supplements for consistent lot-to-lot performance so breast cancer researchers may better understand the carcinogenic progression and identify targets for therapeutic intervention. Studies with cDNA microarrays indicate that culture of human mammary epithelial cells in this medium yield gene expression profiles comparable to those cultured in serum-supplemented mammary epithelial cell culture media, for results representative of normal physiological conditions, but without issues arising from non-specific proteins contained in serum such as lot-to-lot variability and higher background noise.

**Single Step (KRX) Competent Cells** from **Promega Corporation** are designed for efficient transformation of protein expression vectors and tightly controlled protein expression. These cells are derived from an *E. coli* K strain that contains a chromosomal copy of the T7 RNA polymerase driven by a rhamnose promoter (rhaBAD), and provide tight control of proteins expressed via a T7 promoter. Transformation efficiencies are  $>10^8$  cfu/ $\mu$ g, and protein expression levels are equivalent to, or higher than, those observed using BL21(DE3) derived strains; consolidating cloning and protein expression strains into one convenient and time-saving strain.

According to Desdemona De Souza, Product Manager for Proteomics at Promega UK, "Instead of using two different cell lines in a process that takes four days, researchers can now use our new Single Step (KRX) Competent Cells, and protein expression is completed in just two days. In addition, the Competent Cells provide

tightly controlled expression, achieve high protein yields, and can be used for toxic proteins."

**Normal Human Mitomycin C Treated Fibroblasts** and **FibroLife™ Serum Free Culture Medium** from **Lifeline Cell Technology, LLC**, a wholly owned subsidiary of **International Stem Cell Corporation**, allow for creation of human feeder layers for human embryonic stem cell cultures. **FibroLife** also allows serum-free culture of human dermal fibroblasts and supports growth of these cells in a serum-free environment at rates equal to or greater than media with 2-10% FBS over at least 15 population doublings. When studying cell models for stroke and other low oxygen conditions, their **Arctic Ground Squirrel Neural Stem Cells (agsNSC™)** produce differentiated neurons with the unique ability to tolerate low oxygen and low glucose levels. "Using this *in-vitro* cell culture system, researchers can identify novel proteins and genes key to neuronal tolerance; screen drugs for greater tolerance or against free radical injury; and conduct protein and microarray analysis of the protective changes caused by oxygen and/or glucose deprivation," says Jeffrey Janus, President, Lifeline Cell Technology.

#### Assays & Materials

When detecting and quantifying Type I interferon biological activity in cell culture medium and serum, the gene reporter cell-based **iLite™ Human IFN-alpha Kit** from **PBL InterferonSource** is the choice for simple and rapid results. This kit also precisely measures human interferon activity contained within other liquid samples such as cerebrospinal fluid or certain fermentation broths. The exclusive format of this bioassay eliminates the need for continuous cell culture, preparation of viral stocks, and subjective estimation of cytopathology. "We've dramatically reduced the time required to perform this type of interferon activity assay so scientists can expand their research capacity," says Dr. Ronald Jubin, Director of Research and Development at PBL InterferonSource. Reporter cells and sample are added to the kit, and samples are ready in 8-18 hours, depending on the research objectives.

**Integrated DNA Technologies (IDT)** supports researchers who are focused on nucleic acid based technologies. IDT offers a new **RNAi TriFECTa™ Kit** utilizing a dicer-substrate system that represents a substantial improvement over traditional antisense-based processes; IDT guarantees that two of the kit's three dsRNAi duplexes will deliver a 70% knockdown of the target mRNA when  $>90\%$  transfection efficiency and  $>90\%$  knockdown with positive control is demonstrated.

**"We've dramatically reduced the time required to perform this type of interferon activity assay so scientists can expand their research capacity."**

Dr. Ronald Jubin,  
Director of Research and Development,  
PBL Interferon Source

**Thermo Fisher Scientific's Nunc LiveCell Array™** is the first high content analysis tool that enables multiplex, real-time cellular assays on thousands of individual living cells, adhering and non-adhering, using standard microscopy equipment. LiveCell Array technology uses picowell technology, where cells settle into tiny cell-sized wells, measuring 15, 20, 100 or 250 $\mu$ m in diameter. Using a standard microscope slide format, the picowell loading chamber uses 2 $\mu$ l of cell solution, saving on precious cell populations, media and reagents. A sliding glass cover slip is moved over the settled cells, which keeps cells in place, so even non-adherent cells can be analyzed over time without cells moving out of field. With existing microscopes and imaging software, customers can assign a unique address to each cell, permitting an analysis of cellular heterogeneity within populations, versus relying on average results from thousands of cells within a plate well.

#### Companies listed in editorial:

Athena Enzyme Systems – [www.athenaes.com](http://www.athenaes.com)  
 GE Healthcare Bioscience BioProcess Corporation – [www.wavebiotech.com](http://www.wavebiotech.com)  
 Integrated DNA Technologies – [www.idtdna.com](http://www.idtdna.com)  
 Invitrogen – [www.invitrogen.com](http://www.invitrogen.com)  
 Lifeline Cell Technology – [www.lifelinecelltech.com](http://www.lifelinecelltech.com)  
 New Brunswick Scientific – [www.nbsc.com](http://www.nbsc.com)  
 Nikon Instruments – [www.nikoninstruments.com](http://www.nikoninstruments.com)  
 PBL InterferonSource – [www.interferonsource.com](http://www.interferonsource.com)  
 Promega – [www.promega.com](http://www.promega.com)  
 Scientific Industries – [www.vortexgenie.com](http://www.vortexgenie.com)  
 Sigma-Aldrich – [www.sigmaaldrich.com](http://www.sigmaaldrich.com)  
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