5 Cell & Gene Companies to Watch in South Korea

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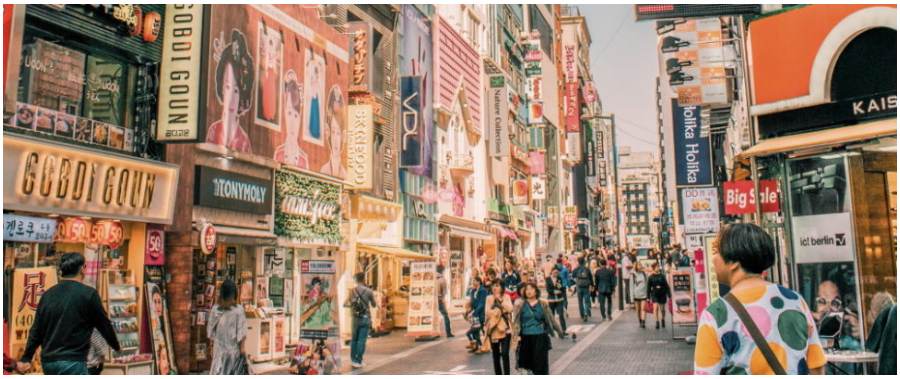

South Korea is the 12th largest healthcare market globally with a market size of around USD 20 billion in 2019. With the government's plans to invest over USD 1.7 billion in its biopharma and biotech sectors over the next five years, the country's prominence in the global biopharma landscape will only grow. Already, South Korean companies have carved out lucrative niches for themselves in clinical research as well as biosimilars.

Another promising area where South Korea is angling to lead the global industry is in regenerative medicine. Already, the first commercialized stem cell therapy globally was developed by a South Korean company. With the demanding research and development requirements of regenerative therapies, their full potential to treat and possibly cure a multitude of diseases currently eluding our best efforts is only just emerging. We look at five of the most promising cell and gene companies in South Korea looking to unlock this potential.

MEDIPOST (Stem cell)

CEO and president: Dr Yoon-Sun Yang

Founded in 2000, MEDIPOST has the distinction of being the first company globally to commercialize a stem cell therapy: their allogeneic human Umbilical Cord Blood-derived Mesenchymal Stem Cell (hUCB-MSC) product named CARTISTEM®, for patients with knee osteoarthritis (OA), which was launched in the Korean market in 2012. They are now proceeding with late-stage trials in the U.S. and Japan. Their second product, PNEUMOSTEM®, a preventive treatment for infants who are at high risk of developing Bronchopulmonary Dysplasia (BPD), also received Fast Track Designation from the U.S. FDA in August 2019, accelerating the potential commercialization of this product in the U.S. market.

Not content with their first-generation products, MEDIPOST is currently developing its second-generation stem cell products for the treatment of osteoarthritis and diabetic nephropathy. These products are developed on their next-generation SMUP platform, which uses advanced proprietary cell selection and culture methods to produce next-generation hUCB-MSC with higher efficiency and lower costs. To facilitate their internationalization, this platform has been patented in countries like Japan, Australia, the UK, Germany, France, and Spain.

MEDIPOST also supplies its stem cell technology, know-how and experience to CELLTREE®, Korea's first and largest cord blood bank. The cord blood units stored as CELLTREE® Cord Blood Bank have been processed with MEDIPOST's proprietary protocols to ensure that cord blood stem cells are frozen and banked (cryopreserved) under optimal conditions.

SCM Lifescience

CEO: Dr Byung-Geon Rhee

Particularly since the appointment of Dr Byung-Geon (BG) Rhee as CEO in April 2018, SCM Lifescience has been very active in its business development, partnering with both local and international companies. Notably, this includes the acquisition of U.S. biotech CoImmune (previously Argos Therapeutics) in conjunction with fellow Korean biotech Genexine, as well as a joint R&D agreement with U.S. biotech Allele Biotechnology for the development of diabetes therapies using pancreatic beta cells derived from induced pluripotent stem cells (iPSCs). They also have a longstanding partnership with Hitachi-PCT Caladrius, one of the top three cell therapy manufacturers in the world. After closing its Series C fundraising round in August 2018, the company had initially planned to IPO on the Kosdaq but following a

biotech industry market rout in the second half of 2019 and in light of the unfolding coronavirus crisis, they are now planning to postpone the IPO for another few months.

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>
> BG Rhee, CEO

SCM Lifescience focuses on developing high-purity allogeneic stem cell therapeutics using its proprietary stem cell isolation technology, which it touts as being able to isolate more homogeneous stem cells compared to existing technology. In our 2019 interview with Dr Rhee, he explained, "other stem cell companies use centrifugation. When they extract the stem cells from the cord blood or bone marrow, there are many other cells present. Hence, the efficacy is low

as the concentration of the specific stem cells is low. Our method also offers a much more concentrated variation of cells."

They currently have a broad R&D pipeline of mostly early-stage compounds, with a focus initially on immune-related diseases like graft-versus-host disease (GVHD) but they are now adding new areas like liver cirrhosis and diabetes. It has its own KFDA-approved GMP manufacturing facility as well as an R&D centre.

Green Cross Cell

CEO: Dr Duck-joo Lee

Green Cross Cell is one of the affiliate companies of South Korean healthcare *chaebol* (large-scale family-run conglomerates that dominate both the South Korean economy and politics) GC Pharma (formerly known as the Green Cross Corporation). Founded in January 2002, its liver cancer immunotherapy agent Immuncell-LC was conditionally approved in 2007. In 2018, the drug gained Orphan Drug Designation from the U.S. FDA for the treatment of liver cancer, brain tumours (glioblastoma) and pancreatic cancer, which will provide an accelerated pathway for this drug to enter the U.S. market.

Following CEO Dr Duck-joo Lee's appointment in March 2017, Green Cross Cell started to commercialize their Immuncell-LC product directly. Sales of Immunecell-LC had been on a steady growth since its launch, from 1.4 billion won (US$1.25 billion) in 2008 to 11.5 billion won in 2016.

Green Cross Cell has now set its sights on CAR-T therapies, forming a slate of partnerships with different biotech companies, including ToolGen, the next South Korean biotech on our list; and U.S. biotech Liminatus Pharma to develop a CAR-T therapy specific to the biomarker guanylate cyclase 2C (GCC). In 2018, parent company GC Pharma decided to integrate the capabilities of its three drug development subsidiaries including Green Cross Cell in a new 'Cell Center' to maximize synergies between the three.

Gene Medicine

CEO and founder: Dr Chae-Ok Yun

Founded in 2014 by Dr Chae-Ok Yun, Professor of Bioengineering at Hanyang University in Seoul, Korea, GeneMedicine focuses on the niche area of oncolytic viruses. Although the potential application of viruses in cancer therapies has been recognized for several decades, oncolytic viruses currently on the market or in clinical trials face several core technological limitations that lower their therapeutic effects. GeneMedicine already has a product for solid tumours preparing to enter Phase II trials, GM101, and

two preparing for Phase I trials in pancreatic cancer, metatstatic liver cancer as well as metastatic lung cancer. In addition to these products, they are also developing a systemically administrable oncolytic virus platform to be able to treat metastatic cancers.

In 2019, they finalized their Series A investment round.

ToolGen

CEO: Jongmoon Kim

ToolGen CEO Jongmoon Kim is rather unique amongst biotech CEOs as he does not come from a scientific or academic background. Instead, he made his name first in IT as the IT entrepreneur who founded the first Korean company to be listed on the NASDAQ: high-speed Internet access service company Thrunet. He moved to the biotech industry in 2001 and assumed the position of ToolGen CEO in 2011.

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>
> Jongmoon Kim, CEO

The company itself was founded in 1999 by Dr Jin-su Kim, who is now the founding Director of the Genome Engineering Center of the Institute of Basic Science (IBS) in Korea. Since its inception, ToolGen has been devoting itself to develop genome editing technology. In our 2018 interview with Kim, he marvelled, "ToolGen Is the only company in the world to develop three generations of landmark genome editing tools" – ZFN (Zinc Finger Nuclease), TALEN (TAL effector nuclease) and CRISPR/Cas9, respectively known as first-generation, second-generation and third-generation genome editing tools. He emphasized, "there are four other companies offering similar technologies: Editas, Intellia, CRISPR Therapeutics, and Sangamo. What differentiates us is that we own the ground IP, so we can license it out to various players."

He revealed, "our genome-editing pipeline covers conditions such as Huntington's, age-related macular degeneration (AMD) and diabetic retinopathy, hemophilia and other lysosomal storage diseases (LSD), and Charcot-Marie-Tooth (CMT) disease. CRISPR technology, theoretically, can offer a cure".

In June 2019, ToolGen briefly agreed to merge with Korean biotech Genexine to leverage both companies' complementary portfolio of technological tools but this fell through only a few months later due to the Korean biopharma stock market market. However, both companies pledged to continue their R&D partnerships with a focus on developing CAR-T products.