

Special Feature

Fujifilm Group Undergoing Transformation from Photographic Film to Healthcare

# Initiatives in Healthcare Business Field, Fujifilm's Medium-to-Long-Term Growth Driver

Under VISION 2016, its medium-term management plan, Fujifilm is focusing on three business fields: healthcare, highly functional materials, and document. Of these, the healthcare business field has been expanded to encompass wide-ranging businesses relating to people's health, from diagnosis to prevention and treatment. Leveraging the Group's extensive range of products and services as well as the technologies accumulated to date, Fujifilm will work to further improve people's quality of life as a "comprehensive healthcare company."

## Diagnosis

▶ For more details, please see page 18.

Having started out with the X-ray film that was launched soon after its founding, Fujifilm supplies medical equipment that includes the Fuji Computed Radiography (FCR) digital X-ray imaging diagnostic system that was the first in the world to bring to fruition the digitization of X-ray images for medical use; endoscope systems; ultrasound diagnostic equipment; and in-vitro diagnostic systems as well as the SYNAPSE medical-use picture archiving and communications systems (PACS).

1936



X-ray film

1971



Endoscope system

1983



Digital X-ray imaging diagnostic system FCR

1984



DRI-CHEM blood analysis system

1989



Dry imagers

1999



SYNAPSE medical-use picture archiving and communications systems (PACS)

2006



Ultrasound diagnostic equipment

2007



DR type X-ray imaging diagnostic system

## Prevention

Drawing on its knowledge relating to collagen—the main raw material for photographic film—as well as antioxidation technologies that help prevent photos from fading and proprietary nanotechnologies that miniaturize the functional materials included in films while stabilizing dispersion, Fujifilm started to sell functional cosmetics and supplements and entered the prevention field in 2006. Fujifilm is expanding its lineup of highly unique products such as the ASTALIFT Series that leverage its technologies.

2006



Functional cosmetics

2006



Supplements

2014



Hair care products

## Treatment

▶ For more details, please see page 20.

In 2008, Fujifilm acquired Toyama Chemical Co., Ltd., and made its full-scale entry into the treatment field. By acquiring a biopharmaceutical contract manufacturing company from U.S.-based Merck & Co., Inc., in 2011 and other moves, Fujifilm has been expanding its pharmaceuticals business. Also, in the field of regenerative medicine, Fujifilm made Japan Tissue Engineering Co., Ltd., and Cellular Dynamics International, Inc., consolidated subsidiaries in 2014 and 2015, respectively, and is making progress in expanding its business fields.

2008



Small molecule drugs (Toyama Chemical Co., Ltd.)

2011



Contract manufacturing of biopharmaceuticals (FUJIFILM Diosynth Biotechnologies)

2014



Autologous cultured epidermis (Japan Tissue Engineering Co., Ltd.)

2015



iPS cells (Cellular Dynamics International, Inc.)

Diagnosis Field Activities Record, examine, utilize

# Medical Systems: Medical IT-Centered Growth Driver of Healthcare Business Field

Centered on medical IT, the medical systems business that is responsible for the diagnosis field develops and supplies a wide lineup of products and services—including X-ray imaging diagnostic systems, ultrasound diagnostic equipment and endoscope systems—to meet needs in a variety of medical fields. Associated with the increased performance of equipment, clinical information is now becoming big data. In addition to managing this data, Fujifilm is promoting the usage of data for analysis and for regional collaboration to create added value, including diagnostic support for doctors and medical efficiency.

## In-Vitro Diagnosis (IVD)

Fujifilm supplies point-of-care testing (POCT)-type\* in-vitro diagnosis systems that use specialized equipment to examine constituents and measure the amount of virus, with blood or other samples dropped into reagents.

\* A checkup that is undertaken in a place that is near the patient, such as a consultation room or hospital ward bedside.

### FUJI DRI-CHEM IMMUNO AGI

An immunity diagnostic system capable of detecting influenza virus to a high degree of sensitivity. Enabling the detection of negligible amounts of influenza virus by the application of silver halide amplification technology utilized in the photo developing process, the proprietary technology is highly regarded, and deliveries of the system to medical organizations are under way.



## Endoscopes

Fujifilm supplies products that target not only the early detection and treatment of diseases such as cancer but also the reduction of the physical burden on the patient. Such products include the LASEREO endoscope system equipped with a laser light source, transnasal endoscopes that place less physical burden on the patient, and double-balloon endoscopes.

### LASEREO

Drawing on laser control technologies accumulated over many years in the photography and medical fields, the LASEREO system controls two laser lights of different wavelengths. Combining proprietary image processing technologies enables the examination of imaging that highlights mucosal surface microvessels and thereby realizes enhanced clarity in the areas of pathological change, such as cancer.



## Medical IT

A picture archiving and communication system (PACS) supplied in the medical IT field, stores on a server images taken by medical image diagnostic equipment—such as CT, MRI, and CR—so that doctors can interpret and diagnose these images on a terminal in a hospital. Leveraging proprietary image processing technologies and knowledge relating to diagnostic imaging that has been accumulated over many years, Fujifilm's SYNAPSE Series provides a high-quality image suitable for diagnosis and also realizes high operational stability. The SYNAPSE has the top share of the market in Japan and ranks second in terms of global market share.

### SYNAPSE VNA (Vendor Neutral Archive)

In hospitals, each treatment department uses different systems to manage a variety of clinical information, such as CT and MRI diagnostic imaging and video of endoscopic tests. In recent years, however, doctors have been calling for systems capable of referring to various types of information and usage of it for comprehensive diagnoses. In response to these needs, Fujifilm provides the SYNAPSE VNA integrated archive system that is capable of the centralized management and storage of clinical information. In 2015, Fujifilm made TeraMedica, Inc., a consolidated subsidiary. Having become the leading company in the VNA market, TeraMedica has installed more than 300 of its VNA systems in hospitals around the world.

### Utilizing Data to Support Diagnosis and Streamline Medical Care

Putting to practical use its proprietary *Image Intelligence™* image processing technologies gained from its photographic, medical, and printing businesses, Fujifilm supplies systems that lead to diagnostic support and increased efficiency in medical care.

### SYNAPSE Case Match Content-Based Image Retrieval System

Utilizing artificial intelligence technologies, the SYNAPSE Case Match system retrieves past medical cases from a database, instantly searches for cases in which the features of pathological changes are similar, and displays them in similar order.



The system supports doctors' image diagnoses that call for accuracy and speed.

### SYNAPSE 3D 3D Image Analysis System

This system analyzes 3D images to render high-precision 3D images from the 2D cross-sectional images provided by, for example, CT and MRI. Bringing to fruition the highly accurate automatic rendering of various organs and blood vessels, the system contributes to easing the burden of not only doctors' interpretations, which are



increasing in step with growing amounts of image data, but also radiologists' creation of 3D images.

## SYNAPSE VNA

### Special Features of SYNAPSE VNA

- Enables users to refer to the hospital's in-house clinical information supplied from each department, and makes it possible to list, by patient, information from multiple departments
- Able to consolidate and store clinical information, contributes to easing the burden from the labor and cost aspects in moving needed data at times of system upgrades
- Enables clinical information from several facilities to be centrally managed under common rules, utilization even at times of regional medical collaboration is anticipated

## X-Ray Imaging Diagnostics

Fujifilm launched *Fuji Computed Radiography (FCR)*, the world's first digital X-ray imaging diagnostic system. Centered on digital radiography (DR)-type systems that convert X-ray energy directly into an electrical signal and are thus capable of displaying captured images more quickly, Fujifilm is currently leveraging its long-established, advanced image processing technologies and supplying systems that display the advances made in lowering radiation dosages as well as in image quality and compactness.

### FDR D-EVO II

Realizing low radiation dosages and high image quality, this is a cassette-sized piece of DR-type digital X-ray imaging diagnostic equipment. Capable of taking images with small amounts of radiation due to the installation of noise reduction circuitry, *Virtual Grid* image processing software decreases the scattered ray effect\* generated inside the body when taking an image and dispenses with the previous need for a heavy metal filter to prevent scattering, thereby making it easier to take an image.

\* X-rays that are irregularly reflected by a variety of substances inside an object when transmitted through that object.



## Ultrasound Diagnosis

While leveraging the synergies between Fujifilm's image processing technologies and the technologies to produce small sized, robust devices of SonoSite, which became a consolidated subsidiary in 2012, as well as both companies' sales channels, Fujifilm is working to expand sales in the growth market of portable ultrasound equipment.

### SonoSite iViz

*SonoSite iViz* is a compact, lightweight, tablet-type piece of ultrasound image diagnostic equipment. In addition to being easily carried on doctors' hospital rounds, its excellent portability means that *SonoSite iViz* can be utilized in other situations, such as home care as well as in emergency and critical care, and supports high-definition image quality.



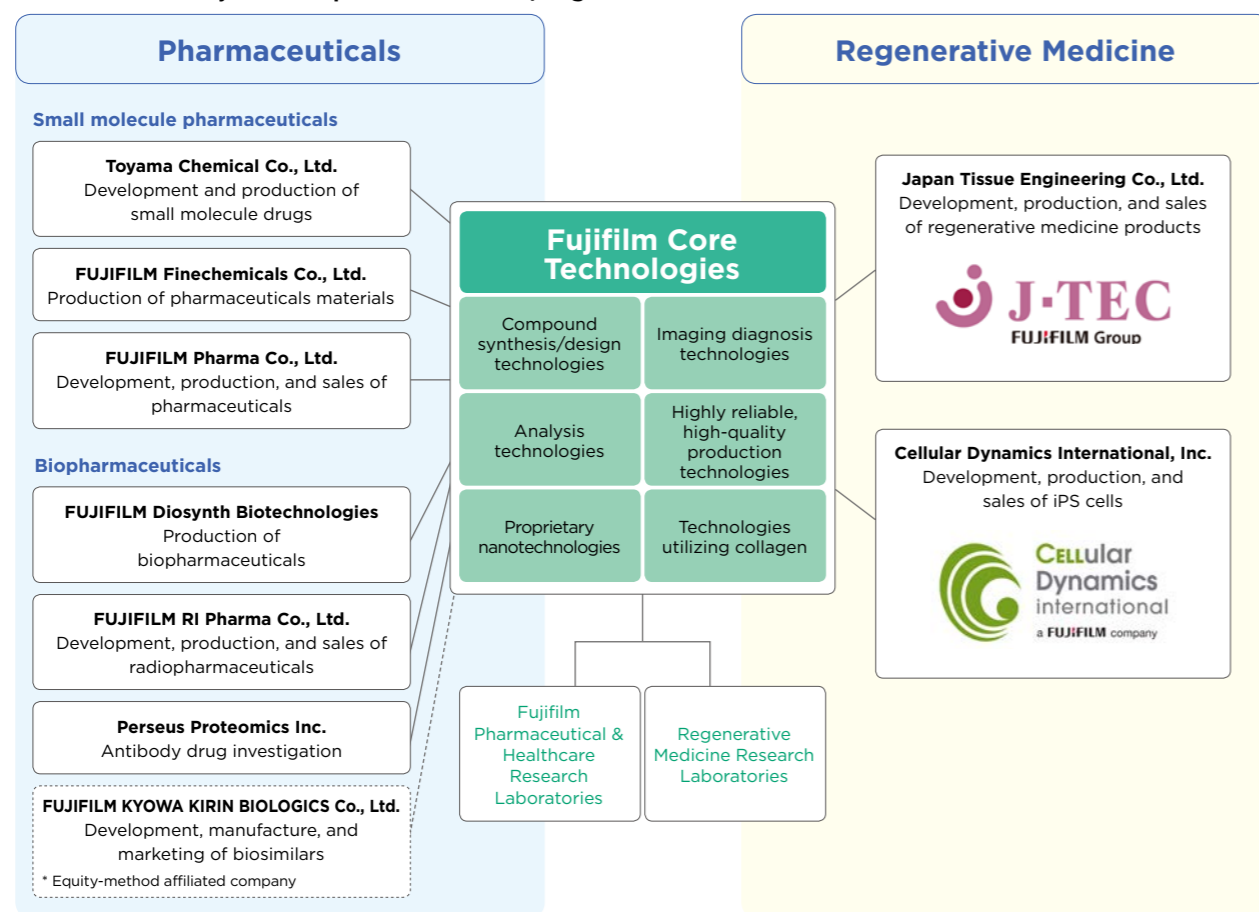


Treatment Field Activities From Drug Discovery Support to Pharmaceutical Development and Regenerative Medicine

# Pharmaceuticals / Regenerative Medicine: Responding to Unmet Medical Needs

In the healthcare business field, the pharmaceuticals and regenerative medicine businesses are responsible for the treatment field. In addition to small molecule drugs, such as the therapeutic drugs for infectious diseases supplied by Toyama Chemical Co., Ltd., which was acquired in 2008, the pharmaceuticals business handles biopharmaceuticals, the market for which is expected to grow in the years ahead due to their fewer side effects and greater efficacy. In regenerative medicine, Fujifilm consolidated Japan Tissue Engineering Co., Ltd. (J-TEC), which supplies the first two products approved as regenerative medicines in Japan, and Cellular Dynamics International, Inc. (CDI), which is a leading company in the development and production of iPS cells that are the key to regenerative medicine. Fujifilm is leveraging the synergies between the three companies while proactively developing the business.

## Structure of the Fujifilm Group Pharmaceuticals/Regenerative Medicine Business



## Fujifilm Technologies That Function in Pharmaceuticals and Regenerative Medicine Businesses

Fujifilm Technologies	Examples of Utilization
Compound synthesis and design technologies that gave rise to new materials in the development of photographic film	→ In making synthesis processes more efficient and prolonging compound stability in the development of pharmaceuticals
Analysis technologies that have been honed through the analytical evaluation of photographs	→ In elucidating mechanisms of action in the development of pharmaceuticals and improving and accelerating the accuracy and speed of development
Proprietary nanotechnologies that deliver stability to locations by refining or functionally combining constituents	→ In making medicines alcohol-free, microneedle formulations, making suspension agents transparent, and extending shelf life
Highly reliable, high-quality production technologies	→ In making the production processes of pharmaceuticals more efficient and more stable
Research into collagen, the main raw material for photographic film	→ In the development of recombinant peptides that form the scaffolds for cell growth and propagation in regenerative medicine

## Pharmaceuticals: Growth Strategies Deployed from a Medium-to-Long-Term Perspective

In Fujifilm's pharmaceuticals business, contract manufacturing of biopharmaceuticals is currently driving growth. Steadily making progress with the development of new drugs in response to unmet medical needs, such as anti-cancer agents and drugs for the treatment of Alzheimer's disease, new drugs in the pipeline are expected to start contributing to profits from FY2019/3.

### STAGE 1 To FY2018/3 Contract manufacturing of biopharmaceuticals driving growth

The contract manufacturing of biopharmaceuticals market is expected to grow by an annual rate of 8%. FUJIFILM Diosynth Biotechnologies, which became a consolidated subsidiary in 2011, developed the high-productivity *Apollo*™ cell production technology and is responding to burgeoning demand by expanding its cost-competitive capabilities and increasing its production capacity. Having acquired the U.S. company Kalon Biotherapeutics LLC in 2014, which possesses strengths in the manufacture of vaccines, Fujifilm is responding to high-mix, low-volume production needs for pharmaceuticals.



### STAGE 2 From FY2019/3 Contributing to profits by making new drugs available on the market

In fields with high unmet medical needs, Fujifilm is conducting R&D with the aim of making unique, top-selling drugs available on the market that have new mechanisms of action. The current status of the main pipeline is listed below.

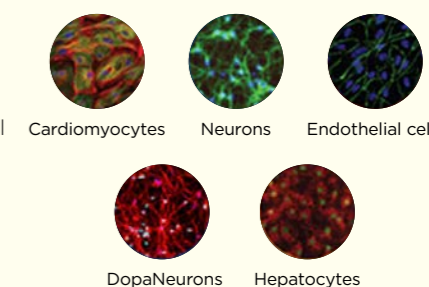
Development Number	Action / Indication	Features / Status of Development
<b>T-705</b>	Anti-influenza drug	Approved in Japan as <i>Avigan</i> ® Tablet in March 2014 Undergoing phase III clinical trials in the United States
<b>T-817MA</b>	Alzheimer's disease drug	Undergoing phase II clinical trials in Japan and the United States In the United States, undergoing clinical development with Alzheimer's Disease Cooperative Study
<b>FF-10501</b>	Therapeutic drug for relapsed or refractory myelodysplastic syndromes (MDS)	Phase I clinical trials in Japan ended. Undergoing phase I clinical trials in the United States*
<b>FF-10502</b>	Therapeutic drug for advanced or recurrent gastric cancer / ovarian cancer	Undergoing phase I clinical trials in the United States*
<b>FF-21101</b>	Therapeutic drug for advanced or recurrent non-small cell lung cancer / pancreatic cancer	Undergoing phase I clinical trials in the United States*

\* Clinical development promotion under way with MD Anderson Cancer Center (United States)

## Regenerative Medicine: Initiatives in Drug Discovery Support That Utilize iPS Cells

In the development of new agents, before testing them on people (clinical trials), animals and others are used for the screening of compounds, verifying absorption and distribution in the body and excretion status as well as the presence or absence of toxins. For these processes, CDI supplies cells differentiated from iPS cells to many users, including pharmaceutical companies and research organizations. Conducting experiments that utilize human cells from the early stages of new drug development contributes to a higher rate of development success and saves cost in check. CDI is changing the way drugs are discovered and anticipating a significant surge in demand for iPS cells.

In the years to come, in addition to new drug discovery support, Fujifilm will leverage its technologies, harness the synergies within the Group by joining forces with both J-TEC and CDI, and drive the industry as a leading company in regenerative medicine.



CDI maintains a wide-ranging product lineup of differentiated cells, such as cardiomyocytes and neurons, derived from iPS cells.