



Key Innovative Industries in Taiwan

Biopharmacy Industry



Information
Security

Next-Generation
Vehicle

Communications
Industry

Internet
of Things

Semiconductor
Industry

**Biopharmacy
Industry**

Smart
Machinery

Circular
Economy

Green
Energy

Service
Industry

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innovation promotion program
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Policy Initiatives — Biomedical industry innovation promotion program

In order to build Taiwan as a hub for the biomedical industry in the Asia-Pacific region, our government launched the "Biomedical Industry Innovation Program" in November 2016. Through strategies such as "building a complete industrial ecosystem," "integrating innovative clusters," "making use of resources on the international market," and "promoting characteristic and key industries," it is hoped that by 2025, the output value of the medicinal product, medical device, and health & wellness sectors in Taiwan will exceed US\$30 billion, with 20 international investigational new drugs developed and available on the market, 80 innovative medical devices entering the international market, and at least ten health service-related flagship brands successfully promoted, making the biotechnology industry a new engine driving Taiwan's economic development. The following are options for places in Taiwan where foreign companies might wish to locate or find local companies with which to collaborate:

1 | National Biotechnology Park |

To accommodate the development of translational medicine research, the "Innovation Incubation Center" has been set up in the Nangang National Biotechnology Park. Other institutions there include the National Laboratory Animal Center (NLAC), the Development Center for Biotechnology (DCB), and the Taiwan Food and Drug Administration. Therefore, the companies here have access to startups in the biomedical field to seek more collaborative opportunities. Besides, in the Park, the resources are available to provide one-stop assistance with such matters as clinical trials, commercialization of R&D results, and information on regulatory restrictions.

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Operational Center of National Biotechnology Park

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Address : 1F, Building C, National Biotechnology Park

2 | Hsinchu Biomedical Science Park |

Inside the Park are the "Biomedical Technology and Product Research and Development Center," the "Industry and Incubation Center," and the "Hsinchu Biomedical Science Park Hospital." These three major centers share R&D resources and take advantage of their adjacency to the Hsinchu Science Park. Businesses based in the Park can join hands with the information and communication industry in the surroundings while engaging themselves in basic biomedical research and translational medicine research, commercialize and verify R&D results, and conduct clinical trials in the Park Hospital to shorten the time to market.

Contact Information

Industry and Incubation Center, Hsinchu Biomedical Science Park

Telephone : 03-6587100

Address : No. 2, Section 2, Biomedicine Road, Zhubei City, Hsinchu County

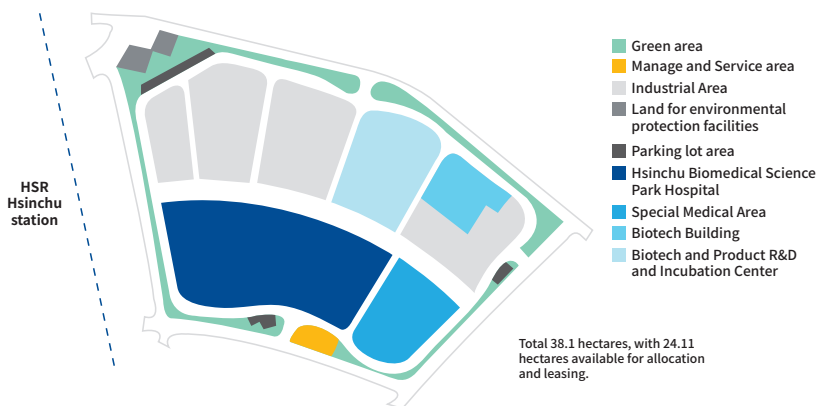


Figure 1 Hsinchu Biomedical Science Park Sitemap

3 | BioMed Commercialization Center |

The Ministry of Science and Technology established the "BioMed Commercialization Center," which, by integrating related resources and strengthening the incubation momentum, can provide businesses with such services as intellectual property analysis, bridging and matching, quick trial production, and clinical regulatory consultation to help expedite commercialization of biomedical technologies and international market exploration.

Contact Information

BioMed Commercialization Center

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4 | Pingtung Agricultural Biotechnology Park |

This is the first park in Taiwan that was set up specifically for the development of agricultural biotechnology. There are currently six industrial development hubs in place that focus on value-added natural products, value-added aquaculture, value-added livestock biotechnology, bioagricultural materials, energy-saving environmentally-controlled agricultural facilities, biotechnology testing, and contract manufacturing. It is expected that after infrastructure expansion in the Park's hinterland is completed for the first half of 2020, the original 233 hectares will be further extended outwards by an additional 164 hectares. This will create nearly 6,000 jobs and generate an output value of more than NT\$18 billion. Services that are available in the Park -- such as one-stop investor assistance, industrial talent referral, a steady supply of raw materials and supplies, startup assistance, and technical support -- will help companies that are based in the Park take root in Taiwan while exploring business opportunities globally.

Contact Information

Pingtung Agricultural Biotechnology Park

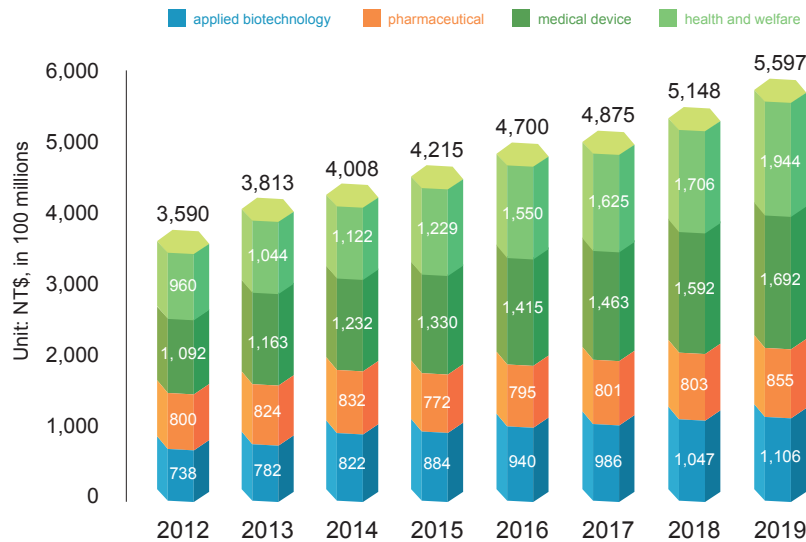
Telephone : 08-7623205

Address : No. 1, Shennong Road, Dehe Village, Changzhi Township, Pingtung County

Overview of Industrial Development

1 | Output Value |

According to the "2020 Biotechnology Industry White Paper" of the Ministry of Economic Affairs, the biotechnology industry in Taiwan mainly includes four major sectors, namely pharmaceuticals, medical devices, applied biotechnology, and health & wellness. The operating revenues of the biotechnology industry in Taiwan came to around NT\$ 559.7 billion in 2019, an increase of 8.72% from NT\$514.8 billion in 2018. The health & wellness sector was the largest, with operating revenues of NT\$194.4 billion, followed by the medical device sector (NT\$169.2 billion), the biotechnology sector (NT\$110.6 billion), and the pharmaceutical sector (NT\$85.5 billion; see Figure 2).



Source: Biotechnology and Pharmaceutical Industries Promotion Office under the Ministry of Economic Affairs, Medical and Pharmaceutical Industry Technology and Development Center, and Industry, Science and Technology International Strategy Center under the Industrial Technology Research Institute, 2020.

Figure 2 Revenue growth in the biotechnology industry in Taiwan

2 | Industrial Clusters |

Taiwan has comprehensive biotechnology and pharmaceutical industry clusters. New drugs, medical devices, and biological preparations are the focus in the north, pharmaceuticals and medical devices are the focus in central Taiwan, and pharmaceuticals, medical implants, and minimally invasive surgical instruments are the focus in the south. The biotechnology and pharmaceutical corridor is effectively connected from north to south (refer to Figure 3).

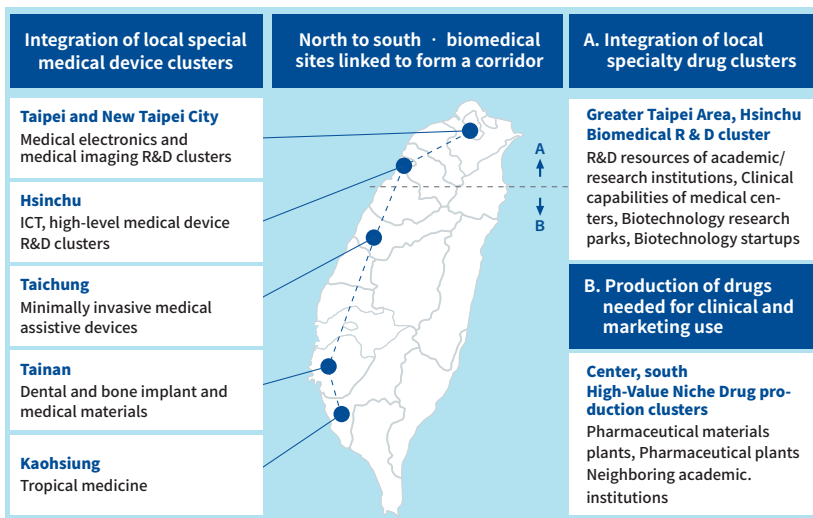
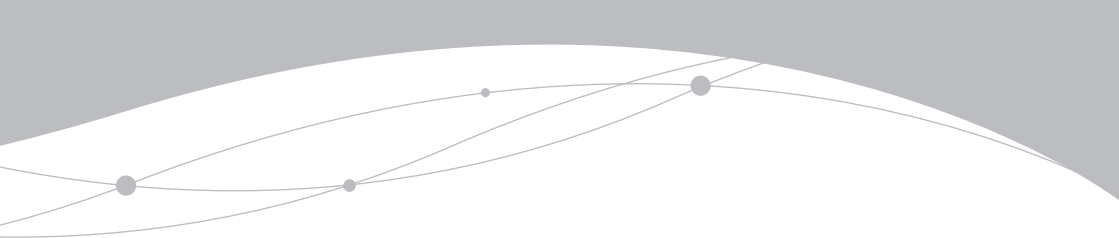


Figure 3 Biotechnology and pharmaceutical industrial clusters in Taiwan

1. Northern Taiwan

In the north, the best known clusters include the "National Biotechnology Park (Nangang)," the "Neihu Technology Park (Taipei)," and the "Hsinchu Biomedical Science Park." The parks in Nangang and Neihu, in particular, focus on innovative biotechnology and pharmaceuticals with new medical devices because of their strong R&D capability. The "Hsinchu Biomedical Science Park" combines the advantages of Taiwan's world-leading ICT technologies at the Hsinchu Science Park with the presence of the Park Hospital. These advantages provide conditions that have supported the



establishment of the Biomedicine Technology and Product Research and Development Center, and the Industry and Incubation Center. Together, these entities form a cluster for medical equipment, in-vitro testing, and biological preparations.

There are many outstanding firms in the biotechnology and pharmaceuticals development hub of northern Taiwan, including the following: Medigen Vaccine Biologics Corporation, which is proactively devoted to the development of vaccines and related biological preparations in response to COVID-19; TaiDoc Technology Corporation, which focuses on biochemical technology, medical electronics, and optics needed for the production of various types of medical devices, and which also does R&D work on rapid tests; Taigen Biotech, which is devoted to the development of anti-infection and Hepatitis C drugs; and PharmaEngine Inc., which focuses on the research and development of new cancer drugs.

2. Central Taiwan

Businesses in central Taiwan, by linking up with the precision machinery industry, have developed precision processing of medical devices and other biotechnology sectors such as the manufacturing of medicinal products at the "Central Taiwan Science Park." Well known manufacturers include Taiwan Noenmei Biotechnology Co., Ltd., which is devoted to the research, development, and manufacturing of heparin, heparinoid, collagen packaging materials, collagen casing, and hydrolyzed protein. Heparin, in particular, is an important natural anti-thrombosis and anti-coagulation drug in the clinical setting.

3. Southern Taiwan

In southern Taiwan, besides the production of active pharmaceutical ingredients, businesses have taken advantage of strong metal processing capabilities in Kaohsiung to develop high value-added metal processing and minimally invasive surgical instruments for dentistry or orthopedics in the "Southern Taiwan Science Park." The largest artificial dental implant supplier in Taiwan, Alliance Global Technology, is one of the best known. In addition, with the advantage that Taiwan has in the agricultural field, the "Pingtung Agricultural Biotechnology Park" focuses on the development of functional foods, modern Chinese medicines, animal vaccines, and animal breeding. Richfield Biotech Limited Company, which specializes in the development of feed additives and microbial preparations; and Timing Pharmaceutical Co, Ltd., which is engaged in the manufacturing of Chinese herbal health-preserving foods, are both based in the Pingtung Park.



Potential Investment and Collaboration Opportunities in Taiwan

1

Entering the biotechnology and pharmaceutical industry clusters in Taiwan

In addition to its complete industrial development hubs in the biopharmacy field, Taiwan also has abundant data accumulated from the National Health Insurance system, clinical experiences, and R&D capabilities, which will help international biotech enterprises set up R&D centers or production sites in Taiwan. The government has identified the biopharmaceutical industry as one of its core strategic industries, and has launched the Biomedical Industry Innovation Promotion Project in order to "build a complete industrial ecosystem," "integrate innovative clusters," "make use of resources on the international market," and "promote characteristic and key industries," thereby supporting the manufacture of reagents and the research and development of new drugs and vaccines. The impact of the current COVID-19 pandemic has fully demonstrated the advantages and capabilities of Taiwan in the biopharmaceutical and biotechnology industries. Foreign companies will be able to jointly take part in the development of the biopharmaceutical industry in Taiwan through collaboration among industry, the government, academia, and the research community in research and development, technical transfer, among other undertakings.

2

Seizing business opportunities in the biotechnology and pharmaceutical industries

Taiwan has competitive advantages in the biotechnology, pharmaceutical, and medical device fields. Taiwan's regulatory requirements governing the approval process for medicinal products are on a par with their international counterparts. In addition, Taiwan has robust R&D capabilities and biomedical talent, as well as abundant international clinical trial experience. It is home to more than 20 medical

centers and 124 clinical trial hospitals. In addition, Taiwan's high-quality biotech incubation mechanism and its interconnected network of industrial development hubs from north to south have made Taiwan one of the world's best locations for innovation, research, and development of new drugs and new medical devices. Future investments by foreign companies in Taiwan in the future will help expedite the timeline of research and development, and will introduce new products to the market and generate business opportunities in the biopharmaceutical industry for all parties.

3 | Taiwan as the Best Manufacturing and R&D Partner

Taiwan's success in curbing the COVID-19 pandemic has fully demonstrated its responsiveness and its capabilities in R&D and manufacturing. With the technical capabilities of the Academia Sinica and National Health Research Institutes, as well as related biotech enterprises that are cooperating in research and development, the nanovaccine and the glycoprotein vaccine successfully developed in Taiwan are now being tested in clinical trials. The outstanding R&D technology of Taiwan has attracted advanced countries such as the US and others in the European Union to work with Taiwan in the development of vaccines. This demonstrates the unparalleled R&D and manufacturing capabilities of Taiwan in the biopharmaceutical field.

Production and management capabilities in Taiwan's manufacturing sector are also the key factors that have made its medical device sector well recognized around the world. Facial masks, protective clothing, and ventilators, for which the demand has significantly surged recently in the fight against the pandemic, as well as prosthetics, contact lenses, physiological detectors, and monitoring devices are all important contributors to growth in the medical device sector in Taiwan. With the pandemic yet to ease, it is expected that Taiwan's ability to curb diseases is again drawing the world's attention to our country's enhanced medical care, medical device manufacturing, management efficiency, and fully integrated information and communication technologies.



4

Early Opportunities to Build a Stronger Presence in Asia-Pacific Markets

As countries in the Asia-Pacific region experience demographic aging and the economies of China and various Southeast Asian countries grow stronger, the demand for basic medicine, home care, health promotion, and medication is significantly increasing, driving rapid growth of the biotechnology and pharmaceutical markets in Asia. Foreign investors -- taking note of Taiwan's industrial base, its advantageous geographical location, its strong ability to link up with international markets, and the government's preferential tax policies and R&D subsidies -- can choose to locate regional headquarters or R&D production sites in Taiwan. A recent amendment to the "Regulations Governing the Administration or Use of Specific Medical Technology-based Testing or Laboratory Medical Instruments" features the lifting of restrictions on cell therapy and autologous bone marrow mesenchymal stem cell transplantation. As a result, Taiwan is now second only to Japan in the use of autologous immune cells for the treatment of various types of cancer, which will help foreign investors to explore for advanced medical care markets the Asia-Pacific region.

Investment Incentive Measures

1

Tax incentives

Taiwan's profit-seeking enterprise income tax rate is 20%. To encourage foreign companies to invest in Taiwan, support industrial innovation, and promote industry-academia collaboration, foreign companies are eligible for the following preferential taxes (Table 1):

Table 1 Preferential taxes

Item	Incentives
Encourage investment in biotechnology and investigational new drug businesses	<ul style="list-style-type: none"> • For the purpose of encouraging the incorporation or expansion of biotech and new pharmaceutical companies, investors who have invested in a biotech or new pharmaceutical company and have held the shares for more than three years are entitled to a deduction from the profit-seeking enterprise income tax payable for a period of five years starting from the year the tax liability is incurred. The amount is up to 20% of the acquisition cost of the shares.
Deductibles for R&D and talent training	<ul style="list-style-type: none"> • Biotech and new pharmaceutical companies undertaking R&D on new drugs or technologies are entitled to a deduction from their profit-seeking enterprise income tax liability. The deduction is limited to 35% within five years from the year the tax liability is incurred. When expenditure on research and development for the current year exceeds the mean R&D budget for the preceding two years, a tax deduction of up to 50% of the excess may be taken. • 35% of the costs of training events focusing on the R&D and manufacturing of investigational new drugs, high-risk medical devices, and emerging biopharmaceutical products organized by biotechnology and IND companies for their employees or in which employees are assigned to take part shall be deducted from the profit-seeking enterprise income tax beginning from the year when the tax starts to be filed. When the expenditure on professional development for the current year exceeds the mean of the preceding two years, a deduction equal to 50% of the excess may be taken.
Introduction of technologies or machinery/ equipment	<ul style="list-style-type: none"> • Royalty payments to foreign companies for imported new production technologies or products that use patents, copyrights, or other special rights owned by foreign companies are, with the approval of the Industrial Development Bureau, MOEA, exempt from the corporate income tax. • Imported machinery which local manufacturers cannot produce are eligible for duty-free treatment.

Item	Incentives
Investment in smart machinery/5G	<ul style="list-style-type: none"> ● Smart machinery: Automatic scheduling, flexible, or mixed-model production lines that utilize big data, AI, and IoT. ● 5G: Related investment projects include 5G communication systems, and new hardware, software, technology, or technical services. ● For investments of no less than NT\$1 million and no more than NT\$1 billion, either "5% of investment spending deducted from profit-seeking enterprise income tax (current FY)" or "3% of investment spending deducted from profit-seeking enterprise income tax, if total spending spread over three years" may be selected, but the total amount deducted may not exceed 30% of corporate income tax that year. ● The applicable periods are January 1, 2019 through December 31, 2021 (smart machinery) and January 1, 2019 through December 31, 2022 (5G).
Technology investment / Stock-based employee compensation	<ul style="list-style-type: none"> ● For the purpose of encouraging high-ranking professionals of biotech and new pharmaceutical companies or technology investors to hold shares, the investors will be exempted from comprehensive tax or profit-seeking enterprise income tax liability for the current year. Tax is collected only after cost is deducted from the income obtained according to the contemporary price upon actual transfer. ● Supported by a majority of the directors that attended the Board of Directors meeting and account for at least two-thirds of all directors and upon approval by the competent authority, biotechnology and IND companies may issue stock certificates to high-ranking professionals or technical investors. Holders of the said stock certificates in the preceding paragraph may subscribe shares in certain quantities at the price agreed upon. The subscription price may be unrestricted by Article 140 of the "Company Act" where it says that the subscription price may not be below par value. The obtained shares are subject to income tax according to the requirement in the preceding paragraph about "deductibles for income from technical shares." ● The worth of shares acquired through stock-based employee compensation can be excluded from the taxable income for that year (up to NT\$5 million). In addition, those that meet related criteria are eligible for reduced taxes based on "acquisition price" or "transfer price," whichever is lower.

Item	Incentives
Foreign Special Professionals	<ul style="list-style-type: none"> Foreign special professionals who meet criteria are eligible for a 50% deduction of total income tax for amounts exceeding NT\$3 million.
Setting up operations in industry parks	<ul style="list-style-type: none"> Companies that set up operations in export processing zones, science industrial parks, or free trade ports are eligible for exemptions on import duties, commodity tax, and business tax for the import of machinery and equipment, ingredients, fuel, materials, and semi-finished products for their own use.
Others	<ul style="list-style-type: none"> Companies that use undistributed earnings to engage in substantive investments may exclude the amount when calculating their profit-seeking enterprise income tax.

2

| Subsidies |

1.The Global R&D Innovation Partner Program

Some foreign companies have a high degree of complementarity with Taiwan's industries. To encourage them to engage in R&D and innovation activities in Taiwan, such companies, after gaining approval from the MOEA, will be eligible for subsidies of up to 50% of total R&D expenditures if they: (1) have technologies that are not yet mature in Taiwan or overseas, and could create strategic products, services, or industries over the course of future industrial development; (2) have potential to help Taiwan produce leading technologies or significantly enhance the competitiveness and increase the added value of important industries; or (3) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain.

2.Integrated R&D Program

Companies, once approved by the MOEA, will be eligible for subsidies of no less than 40% but no more than 50% of total project funding if they: (1) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; (2) establish industry standards, protocols, or platforms; or (3) establish applications, services, and innovative business and marketing models with technological content, and increase industry's added value.

3.Taiwan Industry Innovation Platform Program

The MOEA Industrial Development Bureau and the Ministry of Science and Technology are jointly implementing the "Taiwan Industry Innovation Platform Program" to guide industries to develop towards greater value, and to encourage companies to enter high-end product application markets to increase industry's overall added value. For companies owning R&D teams in Taiwan, the program provides 40-50% of the funding required for theme-based R&D projects, and up to 40% of funding for R&D projects proposed by the companies themselves.

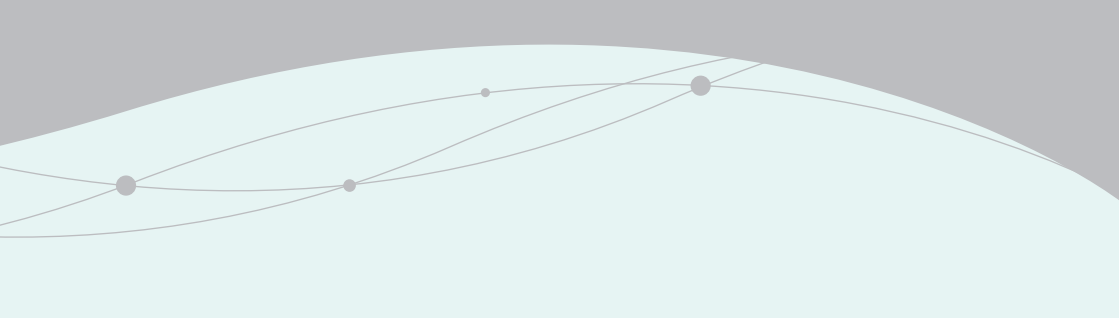
3 | Measures taken by local governments |

To support the development of venture companies, local governments have also provided resources such as "investing in or sponsoring" review or contest mechanisms, setting up "incubation or acceleration devices," training talent on occupational knowledge, and providing free or economic office space, among others, to help venture companies achieve strong growth; this also applies to the biopharmaceutical industry.

Successful Examples of Foreign Companies

1 | Clinical trials |

Many international giant pharmaceutical companies, such as GSK and Novartis, have come to Taiwan to set up clinical trial research centers for investigational new drugs. They have been attracted here by Taiwan's outstanding medical environment, quality healthcare professionals, and medical technology and equipment comparable



to that in advanced countries in Europe and America. Besides, the abundant practical experience in clinical trials as well as strong capabilities are also the reasons why Taiwan attracts such investment. Merck of Germany and Pfizer and Johnson & Johnson of the US, among others, have also established clinical trial or related collaborative mechanisms with medical or R&D institutions in Taiwan, such as Veterans General Hospitals, China Medical University, National Taiwan University, the Industrial Technology Research Institute, and many others, which is conducive to them conducting international/cross-regional clinical trials.

2 | Manufacturing and production |

Pfizer is not only the first foreign pharmaceutical company, but also the largest one in Taiwan. Its products cover cardiovascular disease, the urinary system, vaccines, antibiotics/antifungal/antivirals, pain, cancer, cerebral neurological system, vision care, endocrine system, smoking cessation, female health, hemophilia, immune system, gastrointestinal system, anesthesia, and antidotes.

3 | Collaboration in technical research and development |

Impressed by the R&D capability of the biotechnology and medical device sectors in Taiwan and the associated business opportunities on the market, Denka, the leader in clinical laboratory tests and flu vaccines in Japan, formed a strategic alliance with PlexBio, the precision medicine molecular test technical platform developer in Taiwan, in September 2019. They will collaborate in the field of in-vitro diagnostic ecology. Once product technologies are mature, besides highly sophisticated medical tests, the applications may be extended to animals, plants, and foods, among other life science domains. The business opportunities on the market are huge.





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