SK pharmteco:
Advancing Global API Supply Chains Domestically

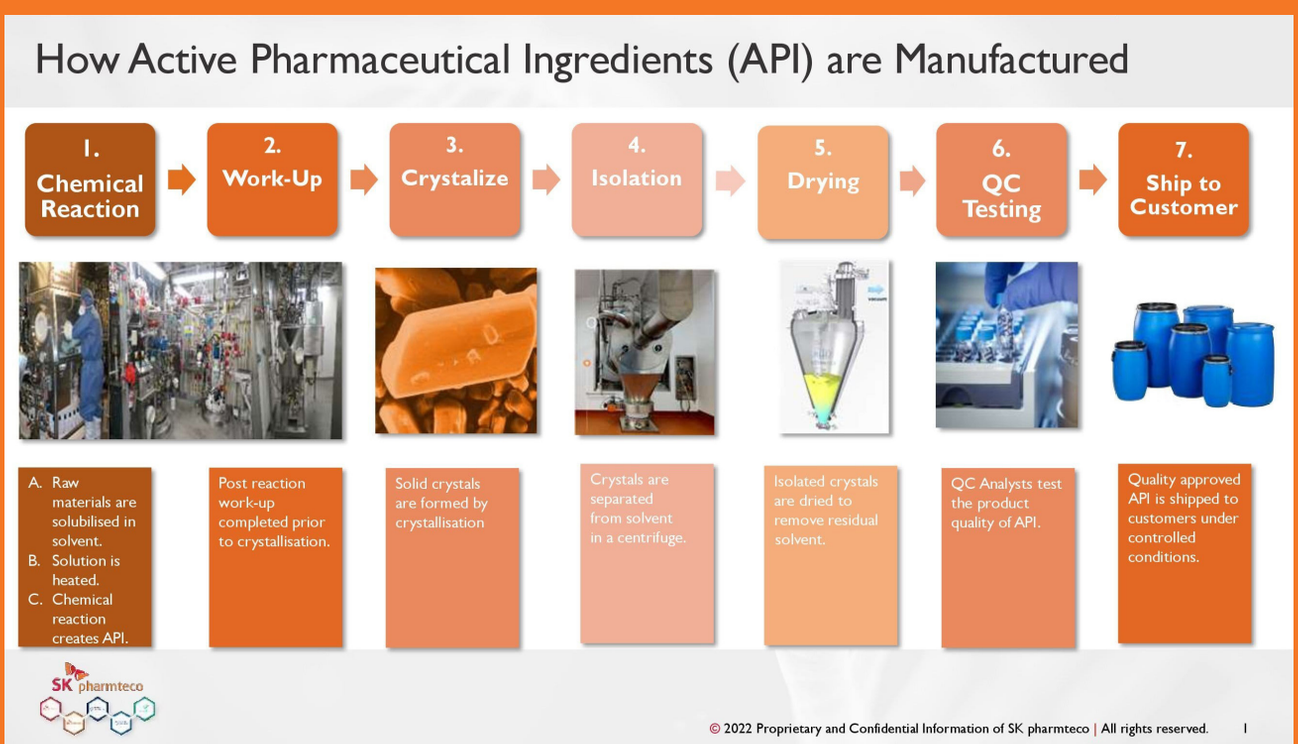
API Ecosystem

What are APIs?

Active pharmaceutical ingredients (APIs) are critical components of the global pharmaceutical supply chain. APIs are the parts of any drug that produce the drug's intended effect—they are what make drugs work. Without APIs, there would be no medications to treat various diseases, or to respond to global health crises. As the COVID-19 pandemic has shown, a reliable and resilient API supply chain is crucial to U.S. public health and health security.

How APIs are Made

APIs are produced via several chemical reactions, which convert pharmaceutical starting materials into chemical compounds called intermediates and then into high-purity APIs.



The Global Landscape

Historically, APIs were manufactured by pharmaceutical companies in their home countries (often the United States or United Kingdom). In the mid-1990s, the United States, Europe, and Japan produced 90% of the world's APIs. The recent growth of the global biopharmaceutical industry, however, has contributed to increased API manufacturing from other sources, particularly in low-cost labor markets such as China and India. For example, the Biden Administration's June 2021 100-day review of pharmaceutical and API supply chains found that 87% of global generic API facilities are now located outside the United States, of which China and India currently account for approximately 42%.

The trend away from domestic U.S. API production has also been driven, in part, by the shift towards lower-priced generic drugs in the U.S. market, which now make up 90% of all prescription medications filled. As generic drugs gained prominence, manufacturers were pressured by lower prescription costs and sought savings in less-expensive labor markets (i.e., China and India). This intense price competition has resulted in the current U.S. API landscape.

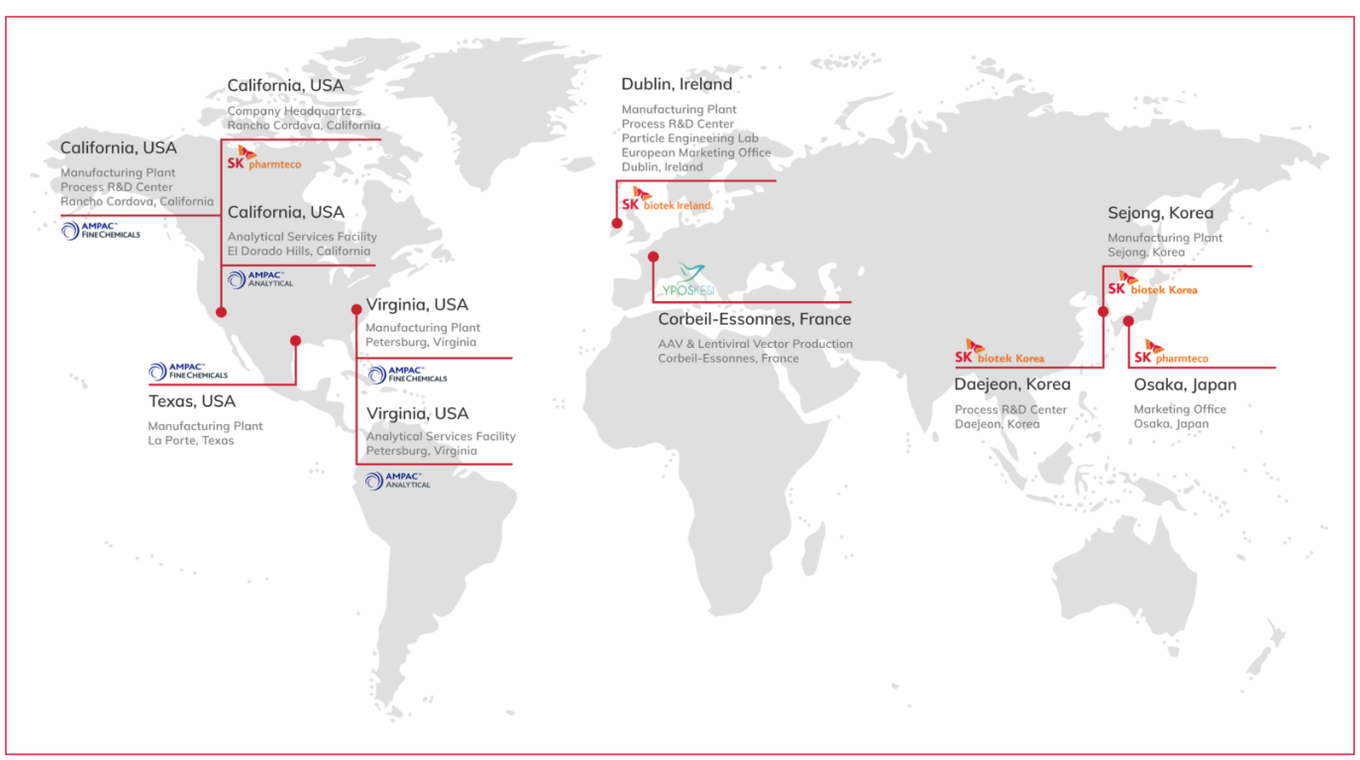
The U.S. Department of Health and Human Services (HHS) has identified economic sustainability as a key issue to support U.S. and allied drug manufacturing. Generic drug production, hampered by low volumes, tight margins, and limited distribution contracts, is a difficult industry for new entrants. As a result, consolidation and competition from foreign competitors have resulted in a domestic supply chain with limited redundancies and significant exposure to major disruptive shocks, as COVID-19 has demonstrated. Securing the U.S. critical pharmaceutical supply chain—particularly for APIs—will be key to protecting against future U.S. public health risks.

SK pharmteco—Safety First, Quality Always

SK pharmteco, a global contract development and manufacturing organization (CDMO), is a trusted partner specializing in the manufacture of APIs, intermediates, registered starting materials, and key building blocks for the pharmaceutical industry worldwide. SK pharmteco's industry-leading pharmaceutical ingredients are used in treatments for oncology, anti-viral, diabetes, and central nervous system disorders.

While SK pharmteco's global headquarters are located in Rancho Cordova, California, leading U.S. production and testing facilities are spread across Rancho Cordova and El Dorado Hills, California; La Porte, Texas; and Petersburg, Virginia, under the subsidiary AMPAC Fine Chemicals (AFC). SK pharmteco also has operations in Ireland and South Korea under the banner of SK biotek, and in France through Yposkesi. SK pharmteco's global manufacturing diversification and redundancies help ensure that a trusted and reliable supply of APIs is available for the United States and allied partners around the world.

SK pharmteco's global presence is known for its innovative processing capabilities, specifically utilizing continuous flow processing rather than traditional batch processing. Continuous flow processing is greener, highly efficient, cost-effective, and supported by the U.S. Food and Drug Administration (FDA). Continuous processing allows reactions to be conducted under challenging conditions, such as at low or high temperature, high pressure, or utilizing hazardous reagents. Through subsidiaries in North America, Europe, and Asia, SK pharmteco has built an innovative global network with mutually supporting research capabilities to become a leader in pharmaceutical development.



AMPAC Fine Chemicals-California

AFC, a leading U.S. CDMO, became part of the SK family in September 2018, expanding SK's manufacturing footprint in the United States. Headquartered in Rancho Cordova, California, AFC-California (AFC-CA) serves as its flagship facility. AFC-CA, employing more than 500 high-skilled workers, possesses several capabilities that support a wide range of processes and technologies, including continuous chromatography, highly potent chemical intermediates and API manufacturing, continuous processing, and safe implementation of highly energetic chemistries.

In addition to production operations, AFC-CA includes AFC's center of excellence for chromatography and energetic chemistries, which has provided training to FDA inspectors for many years. SK pharmteco is expanding its capacity to support a growing pipeline of products from development to commercial status and adding additional processing capabilities to support manufacturing of complex molecules such as antibody-drug conjugates (ADCs), oligonucleaotides, and lipids.

AMPAC Analytical

AFC also has operations in El Dorado Hills, California, with AMPAC Analytical. This facility, employing nearly 40 people, is a leading West Coast analytical lab conducting highly specialized development and testing of intermediates, APIs, and drug products. AMPAC Analytical's work is geared toward method development and validation and product analysis and release. AMPAC Analytical is also in the process of establishing an East Coast presence, co-located with AFC-Virginia in Petersburg, Virginia.

AMPAC Fine Chemicals-Texas

AFC-Texas (AFC-TX), is a multi-purpose manufacturing facility producing registered intermediates and APIs for the global market at facilities in La Porte, Texas (near Houston). AFC-TX currently employs about 50 people. This facility is known for its expertise in performing energetic and hazardous chemistry safely and reliably at a large scale. AFC-TX has demonstrated the capability to handle a wide variety of chemistries required for pharmaceutical production.

AMPAC Fine Chemicals-Virginia

AFC-Virginia (AFC-VA), located in Petersburg, Virginia, hosts the center of excellence for controlled substance manufacutring and U.S. government API supply. Employing nearly 150 people, the AFC-VA plant is boosting the supply of APIs to the U.S. Strategic National Stockpile (SNS) and the Strategic Active Pharmaceutical Ingredient Reserve (SAPIR) as a part of a consortium funded by the Biomedical Advanced Research and Development Authority (BARDA). In Petersburg, AFC-VA is partnering with local stakeholders and educational institutions on workforce development programs to cultivate cross-training across the university system and technical colleges, including bringing a new chemistry curriculum to Virginia State University. These efforts will ensure a local pipeline of talent to support this critical domestic manufacturing for years to come. AFC-VA is also involved in producing pharmaceutical ingredients for several COVID-19 treatments, ensuring a trusted and reliable domestic supply as the U.S. continues to fight the pandemic.

SK biotek Korea

SK biotek Korea is a CDMO with expertise in chemical development, advanced intermediates, and API manufacturing. SK biotek operates primarily in Ireland and South Korea SK biotek's facilities in South Korea are a leading supplier of late-phase and commercial pharmaceutical materials using continuous flow processing. The facilities in Daejeon, South Korea, are an R&D hub for batch and continuous flow processing development. The Sejong, South Korea, facility is a major production facility for commercial-scale API production. Using state-of-the-art automation systems, the Sejong facility contains plant, laboratory, and warehouse operations.

SK biotek Ireland

SK biotek Ireland's Dublin facility ("Swords Campus") has been manufacturing API and intermediates for almost 60 years. For over 30 years, Swords Campus has maintained its leadership in the development, scale-up, and commercial manufacture of highly potent chemical intermediates and APIs. SK biotek Ireland possesses exceptional technical capabilities within R&D, and extensive experience in custom development from clinical phases to commercial launch, scale-up for products. This integrated facility combines manufacturing plants, R&D, and quality control laboratories within the same campus. Swords Campus has a proven track record as a reliable supplier of APIs to multiple customers.

Yposkesi

Yposkesi, located near Paris in Corbeil-Essonnes, France, is one of Europe's largest CDMOs for gene therapy viral vector manufacturing, specializing in advanced cell therapies with a manufacturing platform for viral vectors that support gene therapy applications. The facility is a one-stop shop for biotechnology and pharmaceutical companies seeking to advance clinical trials and commercialize new Advanced Therapy Medicinal Products (ATMPs). Yposkesi offers a full range of services in lentiviral vectors (a type of retrovirus infecting both dividing and non-dividing cells) and Adeno-Associated Virus (AAV) manufacturing. Through this acquisition, SK pharmteco expanded from a CDMO focusing on small molecule APIs to a diverse company with a strong focus on cell and gene therapy as well.

Yposkesi is currently ramping up its manufacturing capacity by building a second drug-making plant at its campus. This facility will double the available production space and will turn Yposkesi into one of the largest advance therapy medicinal product facilities in Europe. This facility is scheduled to come online in 2023 following approval from drug safety regulators in the U.S. and European Union.

Center for Breakthrough Medicines

SK pharmteco is also building upon its trusted global manufacturing presence by investing in innovative companies here in the United States. In January 2022, SK pharmteco invested in the Center for Breakthrough Medicines (CBM), a Pennsylvania-based advanced therapies CDMO. CBM provides an integrated and comprehensive service offering a one-source solution to accelerate speed to market for advanced therapies.

SK pharmteco is proud to be an investor in a cutting-edge CDMO. By partnering with CBM, SK pharmteco is working to create the world's largest end-to-end cell and gene therapy CDMO. In addition to supporting lab and clinical trial material manufacturing, this investment will also enable joint ventures to support the shared goal of eliminating genetic ailments.

Importance of Domestic API Production with Global Redundancy

In the Biden Administration's 100-day supply chain review for pharmaceuticals and APIs, HHS identified "three critical pillars" of a robust U.S. pharmaceutical supply chain: (1) the ability to manufacture high-quality products for the U.S. market; (2) diversification of the drug supply chain, i.e., relying on a geographically diverse set of manufacturers; and (3) redundancy of the supply chain, i.e., the existence of multiple manufacturers for each product and its APIs. To those ends, HHS identified the need to improve emergency API capacity, boost local production, and increase the amount of information available to the FDA to better forecast future supply disruptions.

SK pharmteco is well-positioned to continue to play an important role in producing APIs in the U.S., for the U.S., which ensures a robust domestic supply chain of high-quality pharmaceutical ingredients. SK pharmteco's geographically diverse manufacturing operations across the United States—along with its robust and reliable global supply chain in U.S. allied nations such as South Korea, Ireland, and France—also align with the "three critical pillars" of a trusted and resilient domestic API supply chain.

SK pharmteco is also prepared and willing to build upon its positive working relationships with the Biden Administration and bipartisan Members of Congress to advance a secure U.S. pharmaceutical supply chain. For example, SK pharmteco welcomes the establishment of BARDA-led public-private consortia to boost domestic biopharmaceutical manufacturing capacity and would be honored to participate alongside a range of key stakeholders.

SK pharmteco also welcomes continued and enhanced coordination between the U.S. API manufacturing industry and HHS, FDA, and other government stakeholders. Such coordination—particularly regarding supply chain monitoring and response, domestic pharmaceutical industrial base expansion, and research and development investments—will be fundamental to improving emergency production capacity, workforce development, transparency, and trusted global supply chain redundancy.

How Government Can Help

BARDA Consortium

BARDA has begun exploring the potential for consortia comprised of industry partners across the drug and vaccine manufacturing supply chain to build redundancy and improve core capabilities for biodefense. AFC-VA is currently part of such a consortium alongside Phlow Corporation, Civica Rx., and the Virginia Commonwealth University Medicines for All Institute, to provide generic APIs to SAPIR. This partnership has demonstrated the importance and benefits of public-private collaboration, enhanced by long-term contracts, in securing the U.S. pharmaceutical and API pipeline. SK pharmteco supports the establishment of BARDA consortia to boost domestic API production and has responded to BARDA's Request for Information regarding the prospective consortia.

MADE in America Act *(S.2082/H.R.3927)*

The *Manufacturing API, Drugs, and Excipients (MADE) in America Act*, a bipartisan, bicameral bill sponsored by Senators Jacky Rosen (D-NV) and Tim Scott (R-SC) and Representatives Buddy Carter (R-GA), Darren Soto (D-FL), and Matt Cartwright (D-PA), would support API production through investments in domestic prescription drug and medical device manufacturing. Specifically, the MADE in America Act would create a new tax credit that would apply to applicable manufacturers in certain Opportunity Zones. Congress should immediately seek to approve this tax credit to help manufacturers boost domestic investments, thus enhancing the U.S. pharmaceutical supply chain and U.S. economic growth.

PREPARE Act *(S.2740/H.R.5388)*

The *Promoting Readiness and Ensuring Proper Active Pharmaceutical Ingredient Reserves of Essential Medicines (PREPARE) Act,* a bipartisan, bicameral bill sponsored by Senators Sherrod Brown (D-OH) and Bill Cassidy (R-LA) and Representatives Abigail Spanberger (D-VA) and David McKinley (R-WV), is a critical bill to support domestic API manufacturing. The PREPARE Act would permanently fund the SAPIR and ensure that the United States has a robust emergency stockpile of APIs and generic medications. The SAPIR currently exists through the Virginia consortium with BARDA but is on track to expire by 2030 pending renewal. Congress should immediately seek to approve the PREPARE Act in order for the United States to be better prepared for public health crises like COVID-19.

PREVENT Pandemics Act *(S.3799)*

The bipartisan *Prepare for and Respond to Existing Viruses, Emerging New Threats, and Pandemics (PREVENT Pandemics) Act,* sponsored by Senate Health, Education, Labor and Pensions (HELP) Committee Chair Patty Murray (D-WA) and Ranking Member Richard Burr (R-NC), is intended to serve as the key COVID-19 pandemic response package in 2022. The bill includes several provisions that aim to strengthen and modernize vital medical supply chains and the SNS, including by directing BARDA to support domestic warm-base manufacturing surge capabilities to respond to future pandemics. The bill would also extend the authorization of BARDA's Medical Countermeasure Innovation Partner domestic investment program through Fiscal Year 2028. Finally, the *PREVENT Pandemics Act* would, among other important areas, provide support for States to establish, expand, and maintain their own stockpiles. Congress should approve this critical piece of legislation to ensure the United States is prepared for any future pandemic.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