

## Article

# A Tale in Three Parts: The Success of California's Life Science Clusters

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## ABSTRACT

With the seventh largest GDP in the world, California has the economic heft of a country. One of the largest drivers of economic growth in California is the life science industry. In fact, it is a cornerstone of California's innovation ecosystem, and is characterized by three distinct geographical clusters. There's San Diego's entrepreneurial energy, Los Angeles' emerging incubators and the Bay Area's unique tech influence. All of these clusters drive growth and distinct opportunities for institutes, universities, businesses and entrepreneurs.

This article focuses on: how did California become a life science powerhouse, and what do each of these regions have to offer to the industry?

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## BIOCOM CALIFORNIA: BRIDGE BUILDERS IN THE GOLDEN STATE

**C**LUSTERS REQUIRE STRONG leadership, vision, and an association that moves the industry forward. They require transformative resources, powerful advocacy, access to capital, and essential connections. Biocom California ensures exactly that, accelerating success for life science clusters across the state, providing customized resources and specialized support needed for companies to not only survive – but thrive.

With offices in San Diego, Los Angeles, South San Francisco, Washington, D.C. and Tokyo, Biocom California has built its statewide and global presence to meet the needs of our ever-expanding industry. Biocom California was founded on advocacy, and first and foremost, it is the driving force behind all we do. We speak for the industry in key cities across California, in Sacramento and in Washington, D.C. We work to bring federal research funding to the state, to protect intellectual property that our research institutes and companies create, and better inform public officials about the promise of our industry to Californians.

That said, clusters require more than advocacy work. They need networks. They need connections. So, we build

bridges. We create opportunities for like-minded people to connect on issues and topics they care about, whether it's organizing events to connect life science entrepreneurs with venture capitalists, investing in out of the box sources for growing the biotechnology workforce, such as our military veterans-transition program, or curating customized events for Environmental Health and Safety officers. We consider ourselves the leader in creating and activating networks to connect scientists, policymakers, business development executives, CEOs and academics. Together, these components ensure that any cluster – whether it's the size of San Diego or of California – can flourish.

Biocom California represents members of all sizes, from four-person startups to global biopharma companies, so we also help our members on the capital development front. Biocom California connects member companies with venture capital and other sources of funding through programs including angel investing, licensing and partnering opportunities, M&A discussions, research grant insights and one-on-one discussions.

Ensuring the success of any life science cluster also means building connections outside of not only the state, but the country, too. Today, Biocom California has many formal international relationships – including partnerships with organizations in the United Kingdom, France, Australia and Japan. Strategic partnerships with organizations in Asia, Europe and Australia are crucial not only for the global life science ecosystem, but also for California. These partnerships are carefully assessed,

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ensuring that they are always mutually beneficial: we insist on regular interactions, establish a common set of priorities, focus on economic and social good for our countries, and support for public policies and international agreements that lift up the industry and make it competitive. And one last critical element: a clear and passionate focus on the reason that we are all in this business to begin with – the patients. The sole reason our industry exists is to improve human health around the world, and it is these patients who give our work meaning.

## GOOD THINGS COME IN THREES

One of Biocom's main missions is focused on communicating the vibrant message of California's life sciences industry, whilst also underlining the individual strengths and opportunities of each geographic hub.

## SAN FRANCISCO BAY AREA

The San Francisco Bay Area can be divided into nine micro-clusters, each with differing specializations. It is known as the birthplace of biotechnology, with companies like Genentech serving as the foundation for today's innovation. It's home to world-class universities, including UCSF, UC Berkeley and Stanford, with new discoveries emerging from their research labs every day. While the Bay Area workforce is highly educated and competitive (49.1% have a bachelor's or graduate degree), jobs of all levels are available – even for non-scientists.

According to Biocom California's latest Economic Impact Report databook, the Bay Area's life science industry generated \$139.3 billion in economic activity, employed nearly 150,000 people and had an average wage of \$172,000 in 2019 alone. The Bay Area is known worldwide for its astonishing creativity and boundary-shattering breakthroughs. The result? A culture of entrepreneurship and innovation, which is evident by its abundant VC firms and the global talent it attracts.

With unrivaled spirit and prosperity, it's no wonder both Silicon Valley and the biotech industry were born in the Bay. The region has become a unique crossover between the tech and life science industries, giving rise to job opportunities at the intersection of both, such as biopharmaceutical manufacturing and medical device development. This intersection has led to the emergence of revolutionary technologies and novel sectors. Take synthetic biology, for example: a burgeoning field addressing long-term sustainability challenges in food, energy and other materials.

## SAN DIEGO

San Diego has become known for launching some of the best success stories in the life sciences. While the cluster emerged concurrent with the Bay Area's, it has differentiated itself as a leader in cutting-edge technology in genomics, therapeutics and research. As the home of skilled serial entrepreneurs with respected track records, many startups are successfully launched and acquired by larger pharma companies. Take Agouron, a San Diego-based biotech formed in the 1990s that pioneered the first protease-inhibitor drug to treat HIV/AIDS – and was quickly acquired by Pfizer. IDEC pharmaceuticals, the creators of the first monoclonal antibody drug for Non-Hodgkin's lymphoma, experienced similar success after quickly merging with Boston-based Biogen. Today, virtually every large pharma company has some sort of research outpost in San Diego: Eli Lilly, Johnson & Johnson, Merck, and Novartis have footprints in the region, to name just a few.

But San Diego is not just a place for early-stage innovation. In 2019, the industry employed more than 68,000 people with average annual earnings of \$130,000, bringing the total economic impact of the region to more than \$41 billion. The county is now home to many later-stage commercial entities, including: Dexcom, Nuvasive, Neurocrine, and Acadia Pharmaceuticals, among others.

San Diego is also the worldwide center of the genetic sequencing industry. Illumina is the leading sequencing company in the world, and as a result, has spawned the growth of other regional companies in the analytical, sequencing and personalized medicine arenas.

## LOS ANGELES

The Los Angeles life science industry is significant – and growing by the day. The regional cluster has contributions stemming from a strong academic presence (including California Institute of Technology, University of Southern California, University of California Los Angeles), as well as hospital-focused research institutions such as City of Hope and Cedars-Sinai.

With an increasing number of incubators, accelerators and venture funds scattered across the County, it's quickly becoming a robust ecosystem for scientific innovation – as evidenced by its \$44.2 billion economic impact from 2019 and 93,000 employees. It also received the largest amount of new NIH funding of any county in the state last year, a total of more than \$1.15 billion in the 2019 fiscal year (also representing 25% of total California NIH awards).

## THE LARGEST BIOPHARMA CLUSTER

Broadening our scope once again, I come back to my original question: How did California become a life science powerhouse?

On one hand, the latest generation of new technologies and the convergence of these technologies is a big driver in fueling the state's ecosystem. Big data, artificial intelligence, virtual reality, precision medicine, immuno-oncology, stem cell startups, and digital health all take advantage of the collective power found in these innovative clusters.

Another factor that contributes to successful clusters is the wealth of business and research aptitude. Companies are attracted by the sheer magnitude of talent, funding, relationships, and experience available here. Life science companies in California generate more than \$372 billion in annual economic impact, support more than 1.4 million jobs and our organizations received \$4.59 billion in funding from the National Institutes of Health – the most of any state.

However, perhaps the most important aspect of California is the spirit of community and collaboration woven throughout each cluster and the state more broadly. This is exactly what Biocom California strives to encourage and exactly the foundation needed to support a successful life science cluster.