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Costa Rica

LIFE SCIENCES
SECTOR GUIDE

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RICA**



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COSTA RICA

facts & figures



Costa Rica brings together scientific capacities, infrastructure, equipment, and a world-class business network for establishing partnerships and investments. A leading destination for life sciences offering the best quality of scientific research in Latin America¹.

¹. World Economic Forum, 2014-2015.

Costa Rica ranks #2 in Quality of **scientific research institutions & availability of scientists** in Latin America, #2 **medical devices exporter** in Latin America since 2010².

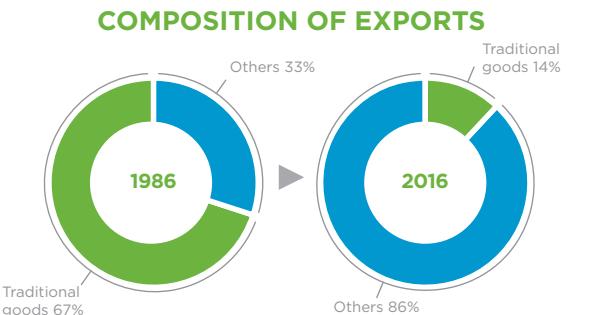
We are a nation that values excellence and embraces opportunities. We are a world-class location, open for business, offering preferential access to the world's global markets through several Free Trade Agreements.

During the last decade Costa Rica has witnessed a steady growth in foreign direct investment (FDI), growing at an annual rate of 13% since 2013, thus representing 4.4% of its Gross Domestic Product (GDP). Even more, FDI reached US\$456 per capita, making Costa Rica rank among the top countries in Latin America in both indexes.

With an ongoing effort to broaden the scope of its supply of goods and services, Costa Rica has also focused on introducing technology solutions in its productive scheme for higher value-added industries. As a matter of fact, biotechnology and nanotechnology sectors promise a great potential for achieving this goal. We have 5% of the world's biodiversity and +3.6 million geo-referenced species in the country, along with a dynamic schooling sector, and its highly qualified human resources.

As for foreign trade, exports of goods and services have also experienced a steady growth, with an average annual rate of 6.3% since 2012.

During 2016 Costa Rica exported 4302 products to 150 countries. Exports of Medical Devices and Pharmaceuticals represented 28% of Costa Rica's total exports of goods in 2016. Exports of life sciences products (medical devices) have grown 15% in the last decade.



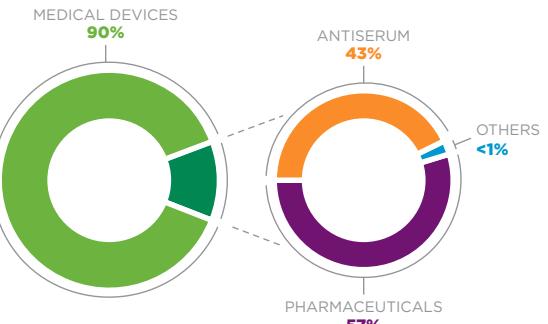
Source: PROCOMER, 2016.
Traditional goods include: Coffee, bananas, meats, sugar.

Costa Rica is a cradle of **human talent** for those who seek excellence. We are proud, educated people, who embrace challenges, learn quickly and welcome new opportunities. A nation with a solid government; and a rather strong support for health, education and the pursuit of self-development.

We offer a convenient interinstitutional collaboration with a multidisciplinary team of experts in electronics, biomedicine, biotechnology, materials and agriculture or environmental applications.

A long **standing-democracy**, a free and mandatory educational system since 1870, and no army since 1949, allow us to invest 7.1% of our GDP on education and 10.9% on health. We continue to build on our vision by fostering the **#1 educational system** and #1 industry-academic collaboration in Latin America to boost our people's success.

MEDICAL DEVICES AND PHARMACEUTICAL EXPORTS 2014 US\$ MILLION



Source: CINDE based on data from PROCOMER.

Why Costa Rica?

- A **strong scientific network for business** - partnership, manufacturing and services opportunities.
- Currently, almost 300 high tech multinational companies are operating in Costa Rica.
- Exceptionally talented and bilingual young workforce. Almost 100% of the employees in multinational companies are local.
- Preferential access platform to 1/3 of the world's population, and 2/3 of the worldwide GDP. Most of the exports of goods are covered by free trade agreements (86%).
- Excellent business climate, rooted on a consolidated democratic tradition, economic and political stability.
- Solid infrastructure. More than 90% of energy is renewable.



LIFE SCIENCES

highlights



Costa Rica has over 50 years of life sciences track record, both in research and in business experience. The existence of quality infrastructure and a strong knowledge base of scientists makes Costa Rica an interesting partner. There is a skilled workforce compliant with GMP, ISO standards as well as FDA and CE-mark regulations.

A broad scope of Life Science suppliers is available. Laws, infrastructure and institutional initiatives have accompanied the development of most of the biotechnology niches in the world. Costa Rica has a suite of laws supporting life sciences sectors and intellectual property in compliance with international treaties. The same time zone and proximity to the USA, where the world's most amount of biotech companies are concentrated, makes Costa Rica an ideal platform for foreign companies to partner with local institutions and companies to network worldwide.

Our science & technology pillars

INTELLECTUAL PROPERTY

Costa Rica ranks **#3 in Latin America for protection of intellectual property**, according to the IPRI (Intellectual Property Right Index). As a national priority, Costa Rica complies with core components as follows:

- It is guaranteed by the National Constitution.
- Modern protection mechanisms meet international standards.
- Protected areas include: Copyrights, Trademarks, Encrypted Program-Carrying Satellite Signals, Industrial Designs, Utility models, Patents, plant varieties and geographical indications
- Legal and political environment, Physical Property Rights, Intellectual Property Rights.

As a member of the WTO, the nation harmonizes its intellectual property rights with the provision of "TRIPS" (Trade Related Intellectual Property Rights).

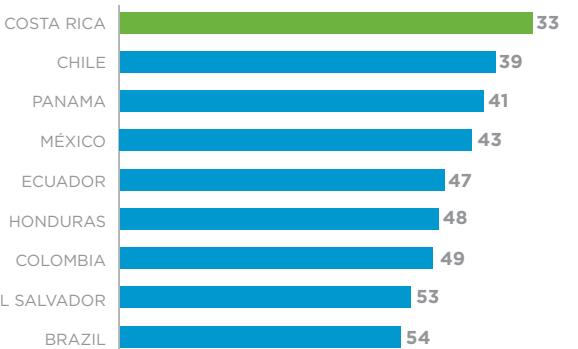
This matter has been formally incorporated in our legislation since 1994 and reinforced with the CAFTA Agreement.

INNOVATION

We have the greatest potential for innovation in Latin America, ranking **#1 in Latin America innovation³**. Costa Rica leads in parameters such as capacity for innovation, quality of scientific research institutions, university-industry collaboration in R&D, government procurement of advanced technology products.

Costa Rica is a source of innovation supported by the establishment of a sound supplier base, comprised of +100 local and multinational companies that improve logistics, reduce lead times, costs and inventory, and improve quality related issues.

UNIVERSITY-INDUSTRY COLLABORATION IN R&D LATIN AMERICAN RANK



Source: World Economic Forum. The Global Competitiveness Report 2015 -2016.

³ World Economic Forum, 2016-2017.

RESEARCH INSTITUTIONS / CENTERS

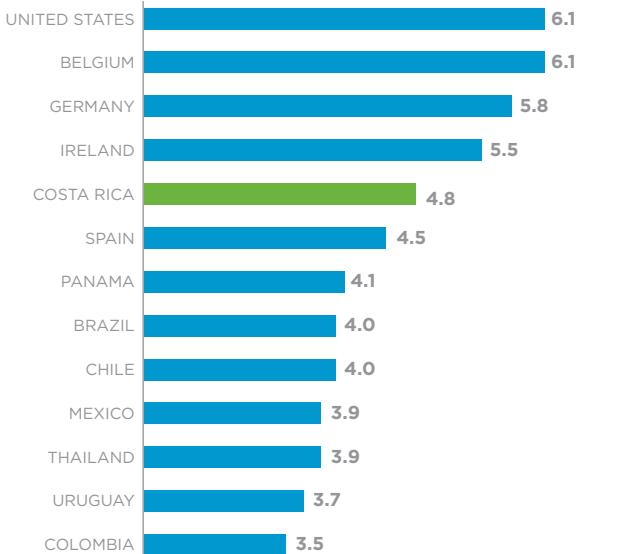
Research centers are an important actor within the high tech industries. Those which are part of public universities in Costa Rica not only fulfill an educational goal but they also provide significant services to companies in the private sector, and they act as support for the development of new products and services for different industries.

There are 35 biotechnology and 6 nanotechnology centers, in Costa Rica. Out of the 41 centers identified, 32 are part of academic institutions (public and private).

Out of the 41 research institutions:

- 16 are within Universidad de Costa Rica (UCR)
- 6 are within Instituto Tecnológico de Costa Rica (TEC)
- 4 are within Universidad Nacional (UNA)
- 15 are within private institutes/organizations.
- 3,300 researchers.
- 80% of the life sciences research is produced by public universities.

**QUALITY OF SCIENTIFIC
RESEARCH INSTITUTIONS
SCORE**



Source: World Economic Forum. The Global Competitiveness Report 2015-2016.

Strengths of the life sciences sector in Costa Rica

- A good critical mass of diversified life sciences companies compared to other Latin American countries, including biotechnology, medical device, industry, environmental and agricultural-oriented products & services.
- A selective group of research institutions with excellent infrastructure for research and development collaborating with the private sector.
- There is flexibility and collaboration from the government and public-private academic sectors. Biotechnology is considered an objective in many governmental organizations by adopting development schemes to enhance and strengthen diverse industries.
- A solid knowledge base of its biodiversity, characterized and geographically identified. Regulations allow a sustainable use of the biodiversity, not presenting constraints.
- A valuable academic sector with a long track record in biotechnology research.
- A broad scope of suppliers for the life sciences sectors.
- There is a strong knowledge base and germplasm bank of identified microorganisms and plants of Costa Rica's biodiversity (INBIO).
- State of the art infrastructure in bioprocessing, nanotechnology, and food technology.
- There is a critical mass of leading medical devices companies (70 multinationals).
- The economy has an intensive high technology industry.



LIFE SCIENCES SECTOR

in Costa Rica

LIFE SCIENCES SECTOR

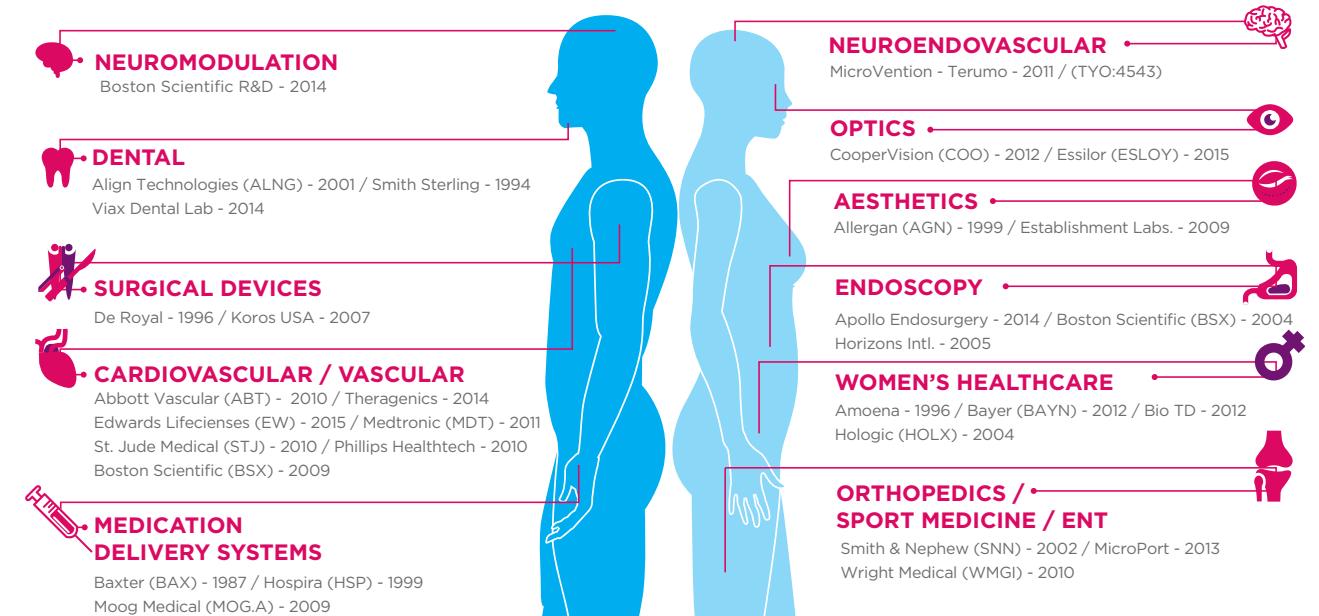
Medical devices

The country has evolved over the years from producing Class I to Class III medical devices including aesthetics, cardiovascular, dental, endoscopy, medication delivery systems, neuro-endovascular, neuro-modulation, optics, orthopedics/sport medicine/ENT & surgical/diagnostics components; which now serve markets in America, Europe, Asia and Oceania. Costa Rica is now the second largest exporter of Medical Devices in Latin America and among the top 7 suppliers to the US market.

"Costa Rica has emerged as a leading location globally, outside of Europe, for MedTech investment, attracting 47 MedTech projects over a five-year period including 18 in 2012, and ranking 7th globally in terms of the number of manufacturing projects ahead of the Netherlands, Brazil and Mexico, between 2008 and 2012." (MEDTECH REPORT 2014 – Oxford Intelligence)

INTERNATIONAL MEDICAL DEVICES COMPANIES ESTABLISHED IN COSTA RICA

Home to 6 of the top 20 largest medical device firms and 5 of the top 10 cardiovascular companies in the world



Source: CINDE, 2017.

LIFE SCIENCES SECTOR

Costa Rica has strong capabilities when it comes to pharmaceutical products manufacturing; from drug testing & trials, to manufacturing and packaging.

Local CMOs have vast experience producing drugs in diverse presentations, these include ophthalmic (cervix cancer screening tests), anti-allergic, antibiotic, anti-inflammatory, anti-histaminic, cosmetics, personal care, natural and disinfecting products, as well as prescription drugs.

PHARMACEUTICAL INDUSTRY COMPANIES

HUMAN HEALTH	VETERINARY PRODUCTS	REGIONAL BRANCHES AND SHARED SERVICES
Alcames	Laboratorio Lisan	Alcames
Apotex	Laboratorio Raven	Calox veterinaria
Calox	Laboratorio Stein	DSM Nutritional
Chemo	Laboratorios Barly	Farmanova
DSM Nutritional	Laboratorios Zepol	Faryvet
Farmanova	Lacofa	Laboratorio Lisan
GlaxoSmithKline	Medipharma	Laquinsa
Grupo Ancla	Technofarma	
Laboratorio Gutis	Total Natural	



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Biotechnology

Costa Rica's history in Biotechnology dates from 1950, when the first cellular biology labs were opened in the country, and since then it has grown to be intrinsic in agriculture, forestry, and industrial productive processes, as well as research and development activities that have experienced significant growth in recent years.

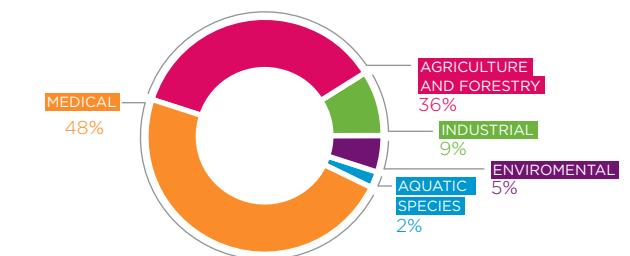
The Costa Rican government supports the life sciences sector, biotechnology and nanotechnology industries are now included as fundamental pillars of the strategic development plan for the country. Evidence of that is the **public interest declaration of the medical device and biotechnological industries** through Executive Decree N°36952-MICITT-COMEX-MEIC, and for nanotechnology and its applications by Executive Decree N°36567-MICITT from 2001.

A Biomedical Research Law, in place since April 2014, allows the country to participate in clinical trials, including provisions that aim to respect the rights of participants, among others, their health, security, informed consent, use of biological samples, withdrawal as participant, privacy, data use and information.

The biotechnology and nanotechnology industries in Costa Rica are formed by four main actors: state, academia, research centers, and the private sector. There has also been a proliferation of business incubators to promote and accelerate the creation of new companies and innovation within these industries.

The Costa Rican Ministry of Science and Technology & Telecommunications (MICITT) presented in April 2014 a report called "Route 2021: Knowledge and Innovation for competitiveness, prosperity, and wellbeing." In it, the importance of biotechnology and nanotechnology is pointed out as relevant players for the continuous success in the fields of energy, food, education, health and environment.

INDUSTRY REPRESENTATION BY SECTOR



Source: Mapping of biotechnology and nanotechnology industry in Costa Rica, Procomer 2014.

In 1997 the National Technical Biosecurity Commission (CTNBio) was created, as part of the Phytosanitary Service (SFE) of the Agriculture and Livestock Ministry, and its main goal is to control that biotechnological processes have an appropriate application according to regulations (IICA, 2013).

Above you will find a graphic presenting the distribution of national companies that are identified as developing research in these fields, according to their products and services.

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Home to 9 of the top 40 food processing companies in the world and growing⁴, Costa Rica focuses on top quality and uniqueness.

Currently, more than 350 different agricultural and food-processed goods are exported to more than 130 destinations around the world.

Servicing demanding and dynamic markets as Germany, Italy, France, the Netherlands, the United States, China, and Japan have become longstanding consumers of our exportable products.

Food companies established in Costa Rica such as Kraft, Cargill, Mondelez, Unilever, Bimbo, Chiquita and Dole, benefit from easy access to high quality, more naturally produced raw materials and agile logistics with transportation from the Pacific and the Caribbean coasts. But in addition, research and development services, technical expertise and support for certification processes; allow companies in Costa Rica to perform under the strictest norms including HACCP, ISO 22000, FSSC 22000, ISO 9001, ISO 14001, Kosher, M Halal, Rain Forest Alliance, USDA Organic, Fair Trade, among others.



4. Food Processing's Top 100, 2014.



Biotechnology in Agriculture

The country has been recognized as one of the biggest suppliers worldwide of high quality agricultural products; from traditional goods such as coffee, pineapple and cocoa, to cantaloupe, tubers, and baby-vegetables to the more exotic and trendy crops like aloe vera, soursop, mangosteen and rambutan.

We also take this production further up the value chain and export jelly, toppings and candied fruits, tuber flour (gluten free), sauces, condiments, fruit concentrates and juices, purees, frozen or dried fruits, and delicious dairy products, among others.

An integral view on sustainable development drives Costa Rica to act under the moto that "we preserve to produce and we produce to preserve". The country has developed further in the value chain with organic agriculture, production under controlled environments, "green" products, fair trade and biotechnology applied to agriculture (plant tissue culture and micropropagation, molecular biology, biological control, cryopreservation, genetic improvement).

Research and findings in the biotechnology field, done by private and government laboratories, have allowed us to explore food engineering and create crops that are resistant to plagues or tropical diseases, creating new seeds (oil palms and cocoa varieties), new fruits (Pococí papaya), and new live organisms (Mediterranean fly) as bio-controllers for plagues.



BIOTECHNOLOGY COMPANIES

*& business
organizations*

BIOTECHNOLOGY COMPANIES & BUSINESS ORGANIZATIONS

CR BIOMED



Website: www.crbioMed.org

Networking media: linkedin.com/company/crbioMed

Matchmaking media: linkedin.com/company/biotech-projects-looking-for-latam-partners

Contact: inforcrbiomed@gmail.com

Costa Rican Biotechnology and Medical Device Business Association (CRBioMed)

CR biomed is the representative entity of the biotech industry in Costa Rica. Formed by the private sector, academia, government, and public institutions, this conglomerate works to optimize the business ecosystem in regards of the Costa Rican biotech sector.

Our members provide innovative, personalized R&D solutions in biotechnology, medical devices and life sciences sector, in order to make more relevant the country's participation in global biotech value chains.

We are focused on these main objectives:

- To provide international exposure to businesses and technological innovations from Costa Rica
- Undertake activities to promote local industry development
- Provide advocacy to facilitate the support of local policies in biotechnology

BIOTECHNOLOGY COMPANIES & BUSINESS ORGANIZATIONS

LAQUINSA

LAQUINSA researches, develops, manufactures and commercializes animal health pharmaceutical products such as antibiotics, anti-inflammatory, vitamins, antiparasitic, digestive system enhancers, B-Lactams, hormonal and disinfectants. It has sterile and clean production rooms for injectables, creams, ointments, liquids and powders which are produced under strict quality control standards. Laquinsa also develops, manufactures and commercialized crop protection products such as co-adjuvants, insecticides, fungicides and herbicides. Its production policy of sustainability earned the company the Ecological Blue Flag Certification. Laquinsa R & D Laboratory is certified by the Scientific and Technological Registry of the Ministry of Science and Technology/CONICIT. Laquinsa is also certified in Good Manufacturing Practices (GMP) for Animal Feed by The National Service of Animal Health of the Ministry of Agriculture and Livestock (SENASA). Laquinsa is certified with the Corporate Use License "Country Brand: Essential Costa Rica"

BIO TD

Based in Costa Rica, BioTD develops biotechnology and medical device solutions in the field of in vitro diagnostics and skin care. With a multidisciplinary/multicultural team and a FDA-approved manufacturing facility, BioTD seeks to have a worldwide projection of its products. The company is actively looking for distribution contracts for its proprietary and WIPO award winning liquid based cytology kit - CITO FEM, used as PAP substitute. Most recently, BioTD has received FDA 510k approval for both skin products ROSS RU and SPB, a hydrogel wound skin dressing and a topical skin care emulsion for relieving various types of dermatoses, respectively.



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URËK BIOTECHNOLOGY

Since 2012, Urëk has provided research and development services for the Costa Rican agricultural industry, in areas such as animal feed and crop improvement, with a team of highly qualified scientists and through collaboration agreements with academic and research institutions.

Urëk is actively looking for research collaborations to address unattended agricultural challenges, through the development of technology that can be implemented in tropical regions worldwide.

SPERATUM

Speratum is a Costa Rican biotechnology company dedicated to research and development of patented therapeutics and diagnostics based on miRNA for combatting pancreas cancer. miRNA has been discovered to regulate and deregulate components of functional protein networks that can cause multifactorial diseases leading to cancer. Speratum's promising research uses this knowledge in creating therapies that bring back the natural balance to the body and stop cancer development.

BIO ENGINEERING

Bio Engineering researches and develops products and solutions for the food ingredients, feed ingredients, aquaculture, waste and wastewater industries. These developments involve innovative biotechnological processes with enzymatic, biological and organic solutions. Its sustainability policy earned the company the Ecological Blue Flag Certification. Bio Engineering belongs to the Central American TRISAN Group established in 1961.

The company is certified ISO 9001 Quality and ISO 14001 Environmental Standards.



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CARAO VENTURES

Carao Ventures invests and accelerates the growth of high potential startups in Central America. Carao Ventures offers advisory services, access to capital, and an array of other resources, therefore providing the necessary support structure for startups in early stages. Although the company invests in various verticals, it has developed a keen interest in businesses with innovative scientific solutions, including biotechnology among the main branches. Given the increased relevance of biotechnology in Costa Rica, as well as the availability of qualified human resources, this sector now offers very promising opportunities. Additionally, the company has a firm commitment in developing a healthy business ecosystem throughout the region. Carao Ventures' main office is located at San José, Costa Rica.



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MARKETPLAZA

Marketplaza (InnovaMarketplaza S.A.) is a consulting company serving Latin American biotechnology companies through the internationalization process as an alliance manager and innovation management consulting service. With a combined academic background in MBA and life science, Marketplaza carries out business development activities through its worldwide network of contacts in pharma, biotech industries. Also, carries out consultancies for governmental entities and international organizations for studies on the Latin American biotech industry and business climate and investment opportunities. Founding member of CRBiomed.

SALUD A UN CLIC

Latin american health information technology company. We provide advanced software and health technology solutions for telehealth, primary and secondary health, data mobility, data intelligence, data interoperability, apps and devices.

REUTI-PIÑA

Reuti-piña is a Costa Rican Biotechnology company dedicated to researching and extracting the active isolated components from the pineapple biomass. The technology Reuti-piña implements utilizes enzymes and microorganisms for the production of substances that are of great interest in the food, pharmaceutical, make-up and crop industries. Also, generating scientific knowledge, new raw material and technology of easy implementation to provide solutions to the clients' needs and problems.

Reuti-piña is working very hard on a triple impact model that seeks to contributing to the reduction of the drawbacks associated to the pineapple growth, especially for the involved companies and the surrounding communities.



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MAGENTA BIOLABS

Magenta Biolabs, is a Costarican startup which transforms agroindustrial organic by-products into raw materials highly quoted in the market.

So far, we have developed a process to produce hyaluronic acid for the cosmetic and biomedical industry, and our platform will keep growing for another products



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FLOREX

FLOREX specializes in providing comprehensive cleaning solutions that are eco-friendly, in addition to designing, manufacturing, and distributing biodegradable cleaning products of the highest quality and performance. FLOREX cleaning products are produced by controlling their entire life cycle, comprising from the design to their disposal, taking into account the eco-friendly production facilities, which stand out in the Central American industry. The various raw materials of FLOREX products are imported from different countries. They all possess a degree of biodegradation of over 70% in 28 days. FLOREX conducts a continuous R&D process, and is currently developing a new line based on microorganisms used for biodegradation of organic matter, industrial waste, soil and water bioremediation, and other applications in several fields.

ARIAS

Arias is a full service legal firm. Arias is unique in Central America, as it operates as a single firm rather than an alliance or network; and currently has seven fully-integrated offices in six countries: Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. It has become not only a solid, but also an innovative legal firm that continues to spread its influence throughout the region. For clients, choosing the right legal partner is key.

Arias and its dedicated lawyers, with their core experience over a broad range of practice areas and industries, unlock the regions intricacies and subtle differences in laws. The firm is truly a one-step, one-stop law firm offering clients the benefits and demonstrated advantages that come from having all their regional businesses served from one, fully integrated base.

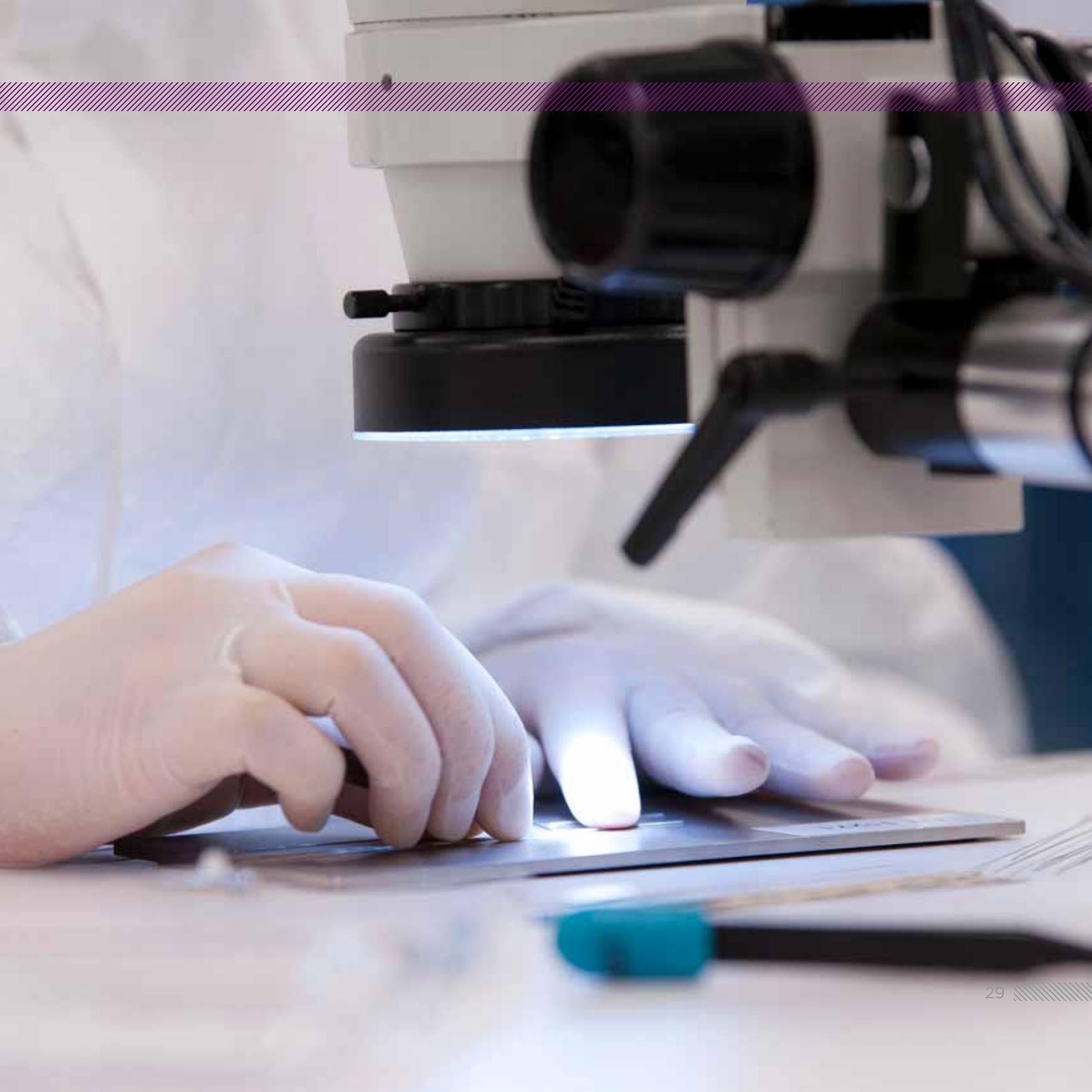


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SUPPORT INSTITUTIONS

CR biomed works closely with the following national governmental and academic organizations for contributing to the development of national biotechnology and industries in medical devices:



PROCOMER
(COSTA RICA EXPORTS
PROMOTION AGENCY)

Institution responsible for promoting Costa Rican exports of goods and services to the world. We facilitate and promote commerce abroad and investment.

COMERCIAL PROMOTION DIVISION

Telephone: + 506 2505 4700
Email: servicios@procomer.com
Web: www.procomer.com



CINDE
(COSTA RICA INVESTMENT
PROMOTION AGENCY)

Active promotion of foreign investment, local support, and post-establishment services.

LIFE SCIENCES DIVISION

Email: invest@cinde.org
Telephone: +506 2201 2800
Web: www.cinde.org



MICITT
(SCIENCE, TECHNOLOGY AND
TELECOMMUNICATIONS MINISTRY OF COSTA RICA)

Dictate public policy for science, technology and telecommunications, allowing the country to promote the use of knowledge and innovation, to prioritize and lead industry initiatives on competitiveness, welfare and prosperity.

RESEARCH & DEVELOPMENT DIVISION

Marcela Monge
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Web: www.micit.go.cr



MICITT
(SCIENCE, TECHNOLOGY AND
TELECOMMUNICATIONS MINISTRY OF COSTA RICA)

We are the national institution that propitiates and supports social and economic development, through policies that foster the competitiveness of industry, trade and services, particularly micro, small and medium enterprises. We promote production linkages, boosting the governmental capacity to manage trade, and to ensure fair competition, regulatory improvements and consumer support.

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Web: www.meic.go.cr / www.pyme.go.cr

Potential opportunities for life sciences industries in Costa Rica

DIAGNOSTICS

This sector is closely related to the medical device industry as it shares similar suppliers and regulatory terms. The country enjoys qualified labor force in any of these areas due to the almost 20 years existence of the biotechnology engineer career and other related careers. Therefore, Costa Rica can become an interesting target for a diagnostics company which is able to outsource production in an overseas location, where it enjoys manufacturing advantages. Diagnostics is the highest growing healthcare sector ready to deliver strong double-digit annual growth over the next several years and Costa Rica is well suited to participate in this trend.

BIOPHARMA

The biotechnology knowledge background of the country is gaining interest of foreign companies sourcing biodiversity based opportunities for the biopharma industry worldwide. Partnerships with European and US-based companies with Costa Rican institutions have been increasing in the last 15 years. Costa Rican CMO's (contract manufacturing organizations) are hired by biopharmaceuticals for carrying out their developments to the production phase. Working with CMOs in CR can result as a precursor for future biopharmaceutical development within the country.

CLINICAL TRIALS

Costa Rica carries out 20% of the clinical trials in Central America and The Caribbean excluding Puerto Rico, positioning itself in the top 3 countries of the region. Nearly 150 clinical trials have been conducted in the country for more than three decades sponsored by multinational companies such as Roche, Novartis, Pfizer and GlaxoSmithKline, among others.

The country has a solid institutional and legal structure with an international track record, that includes SMOs, CROs, as well as regulatory institutions such as the National Council of Health Research (CONIS) -part of Costa Rica's Health Ministry-, Scientific Ethics Committees and private hospitals with international





accreditations. Research companies follow Good Clinical Practices in compliance with ICH. The National Insurance Company (INS) grants a special civil responsibility insurance to the sponsors in order to support the institutions and patients involved in the studies.

Costa Rica has also consolidated a solid legal framework since the Research on Humans Law was enacted in 2014 along with its corresponding Regulation, becoming the first country in Latin America with a research on humans law.

Some of Costa Rica's success factors in biomedical research are:

- Well educated population that understands the voluntary involvement in a research project.
- Varied ethnicity
- An internationally acknowledged public and private healthcare system
- Health ratings similar to developed countries
- Qualified personnel

While the majority of clinical trials conducted in Latin America are Phase III, in Costa Rica Phases I and II are conducted regularly, as well as Phase III.

BIOINFORMATICS

New initiatives from the academia such as a master's degree program, the biotechnology engineer

program, a multilateral commission, participation in an international cluster, have given way to the production of more than 600 students over the past 5 years. Demand for bioinformatics services has been increasing mainly from local research. A pioneer company established has allowed new advantages and incentives encouraging more companies to find out more about the local human resource capacity.

PHYTOMEDICINES

Clearly this niche is a winner for Costa Rica due to its rich biodiversity and an internationally renowned reputation. Regulations are clear, both for access of biodiversity and its commercial exploitation through the National Council for Biodiversity Management

(CONAGEBIO). Many local and international companies have developed proprietary phytomedicines and phyto-derived products based on Costa Rica's biodiversity through collaborations with the many technological research institutions in the country.

OTHER BIODIVERSITY-DERIVED PRODUCTS

Fungus biodiversity has varied applications (antibiotics, natural fertilizers, biocontrollers, secondary metabolites, among others) that are highly valued by biotechnology companies throughout the world. This niche is extremely attractive to R&D companies.

A photograph of a scientist with short hair, wearing yellow-tinted safety goggles and a light blue lab coat over a white shirt. They are smiling broadly at the camera. In the background, there are blurred laboratory glassware and equipment.

SCIENTIFIC & TECHNOLOGICAL

*capacities in
research & development*

SCIENTIFIC & TECHNOLOGICAL CAPACITIES IN RESEARCH & DEVELOPMENT

Costa Rica has a high potential in educational programs that includes the educational development in biotechnology and nanotechnology majors. On the academic area in the field of biotechnology it should be noted that both Universidad de Costa Rica (UCR), Universidad Nacional (UNA) and Tecnológico de Costa Rica (TEC) have specialized programs and high-level in this branch.

In nanotechnology academic offering, we have universities with concentrated programs (UCR, TEC and UNA) that are taught with greater affinity to nanotechnology and development of new materials. It should be noted that the TEC has one of the most advanced laboratories of nanotechnology and microscopy of the country, and since 2010, it also offers the possibility to graduate as a technician in nanotechnology, a unique program in Central America.

Web: www.cita.ucr.ac.cr



BIOLOGICALS

Instituto Clodomiro Picado

A 40 year-old public institution offering R&D services and products, associated with the UCR and Minister of Health of Costa Rica.

The Clodomiro Picado Institute vision is to be a leading international institution in the study, prevention and development of therapeutics against poisoning by venomous animals, while maintaining a high quality, innovating and diversifying the research, teaching, social work and production. One of the world's renowned antivenom snake serum banks. WHO 2011 Public Health Award. Some facts about this institute:

- Produces an average of US\$3MM of antiophidic serum and antitoxins sold worldwide.
- Performs protein analysis. Services provided for veterinary, human and other projects in development.
- The laboratory also collaborates with groups of researchers who work in hospitals and other universities in order to carry out clinical trials and field studies.

Web: www.icp.ucr.ac.cr

INCIENSA

The Costa Rican Institute of Investigation and Education in Nutrition and Health (INCIENSA), since 1977 is associated to the Ministry of Health. Institution responsible for epidemiologic surveillance and research on public health priorities as well as diagnostic technologies, health assurance and education.

Centers of reference in:

- Bacteriology (belongs to WHO Global Foodborne Disease Surveillance Network).
- Virology.
- Parasitology (chagas, dengue, malaria, leptospirosis).

Web: www.inciensa.sa.cr

BIOSURVEILLANCE

BIOPROCESSING

Cenibiot

The National Center of Biotechnology Innovations was created in 2007. It is an international collaboration project between the Government of Costa Rica and the European Union. A pilot plant for scaling-up of pre-industrial fermentation technology with multidisciplinary accessory labs (microscopy, chromatography, microbiology, molecular biology, analytical chemistry).

Cenibiot contributes to the competitiveness of agro industrial companies by scaling-up added-value biotechnology innovations.

Web: www.cenibiot.ac.cr

Center for Biotechnology Research

The Center for Biotechnology Research (CIB) belongs to the Costa Rica Institute of Technology. Provides R&D services in the fields of molecular biology, cell culture, and bioprocessing. With the cooperation from the International Atomic Energy Agency (IAEA), established a human tissue culture laboratory for the development of therapies for burns and healing of wounds.

BIO SCIENCE

CIB is known for its successful research in agriculture tissue culture, achieving innovative approaches in collaboration with nanotechnology, electronic microscopy and radiation technologies. CIB has international collaborations with institutions in USA, Argentina, Brasil, Colombia, Ecuador, Mexico Spain, Germany, Singapore and China.

Web: www.tec.ac.cr/sitios/Docencia/biologia/cib/Paginas/default.aspx

NANOTECHNOLOGY RESEARCH CENTRE

LANOTEC

The National Nanotechnology Laboratory of Costa Rica (LANOTEC) specializes in research, design and implementation of nanotechnology-related technologies. It focusses on the synthesis and study of new materials; as well as knowledge transfer and technology from academic environments to several industries. Currently LANOTEC has an interdisciplinary research team, a scientific director and growing infrastructure. LANOTEC makes available the following resources for industry and academic researchers:

- Work area of 500 m².
- Equipped clean room for synthesis and characterization of nanomaterials.
- Laboratory for fabrication of nanostructured materials and sample preparation.
- High-performance computing infrastructure for simulation of physical-chemical phenomena and high-level visualization.

LANOTEC is currently equipped with instruments for Atomic Force Microscopy (AFM), Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM), Thermogravimetric Analysis (TGA), Differential Scanning Calorimetry (DSC), ATR-FTIR (with TGA), Isothermal Titration Calorimetry (ITC), Goniometry, microgravity studies, among others. The research and development in LANOTEC are:

Instrumental and Characterization. Applications of instruments and techniques to determination of mechanical, thermal and electric properties of materials.

- Synthesis of Nanostructured Materials. Physical and chemical processes for production of molecular structures and materials with diverse properties such as surfaces and nanoparticles.
- Computational Nanoscience. Application of mathematical modeling and computer simulation for the comprehension of nanoscale phenomena and support for experimental developments.
- Bionanotechnology. Study of features and interactions of biomolecules and their applications via nanometric manipulation techniques.
- Nanoeducation. Program to look for a talented and capable young in science and technology from the high school levels.

Nanobiodiversity

LANOTEC has promoted and created companies with MSME (PYME) funds from the National Council for Research in Science and Technology CONICIT, based in part or totally on nanotechnologies. Data are included of the companies based on nanotechnology in Costa

Rica and that have been worked under the innovation program in LANOTEC. The scope of the results obtained so far are national and they have great relevance for the development of the country, whose economy is currently strongly based on services, agribusiness and, to a lesser extent, the electronics sector. The companies created or promoted through LANOTEC's innovation program are all Costa Rican capital, and are pioneers in the field of national nanotechnology.

We are convinced that the economy of a country is based on the implementation of small companies that produce materials and objects of high added value, rather than large multinational maquiladora companies. In Costa Rica the human capital and the equipment to position the country in niches of market in nanotechnology are left over.

Web: www.cenat.ac.cr/gestion-ambiental/lanotec/resena

+20 RESEARCH CENTERS AND LABORATORIES

University of Costa Rica

The **Institute of Investigations in Health (INISA)**, performs research on the origin of factors that determine health problems in the community and serves as advisory services to public health stakeholders on topics such as gastric cancer, hereditary mental degeneration, among others.

The **Centre of Investigation in Cellular and Molecular Biology (CIBCM)**, investigates topics related to pathogens in plants, viruses that affect animals, biopesticides, and environmental microbiology.

The **Biological Tests Laboratory (LEBI)**, promotes research through biological testing of possible mechanisms of action of chemical substances, biological, biotechnological of human and animal consumption.

Web: <http://www.ucr.ac.cr/investigacion/>

OUR FIVE VALUES OF COMPETITIVENESS

excellence

Companies that offer value added, quality, specialization due to their human talent.

innovation

Companies that create value for the end user through ingenuity.

Costa Rican origin

Companies linked to Costa Rica through their products, services, intellectual property and human resources, among others.

sustainability

Companies that achieve success in harmony with the environment and the social conditions.

social progress

Companies that strive for the wellbeing of their associates by providing opportunities to achieve professional and personal goals.

essential
**COSTA
RICA**

