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California-Mexico Innovation Exchange

February 27, 2025

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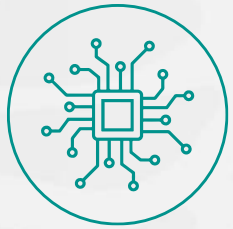
Research areas

Biological and Health Sciences

Exact and Natural Sciences



Technology and Engineering Sciences

Social Sciences and Humanities

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Some relevant numbers...

590 full-time researchers

68 postgraduate programs (Master and/or Doctorate)

More than 16,000 students graduated since its creation in 1961 (more than 1800 students currently registered)

Unique role academic institutions play in helping translate life science research into new technologies or ventures

Expertise in generating knowledge

Collection, analysis, and management of experimental data, which makes possible to propose precise hypotheses when solving a problem.

Discussion and interpretation of the results among peer experts.

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Main Objectives in Innovation

- Provide solutions that contribute to human well-being, helping to address complex challenges and problems, through the training of professionals and scientists with the best competencies.

- Conduct frontier research that offers solutions to problems that high technology can solve.

How do these objectives shape approaches to international collaboration?

We establish international collaboration with institutions that jointly create solutions with a global perspective, providing scientific solutions that can be applied on a larger scale.

What elements are required for international collaboration to be successful?

Have a sufficient understanding of each entity, making agreements so that each institution contributes to the collaboration with its strengths.

Has your perspective on innovation and international collaboration changed considering recent changes to public policies for research funding? If so, how?

The **National Innovation Plan** considers actions aimed at reducing technological dependency, designing mechanisms to identify scientific knowledge and technologies with the potential to address needs and tackle priority problems, and promoting the execution of technological development, innovation, technology maturation, and scaling projects.

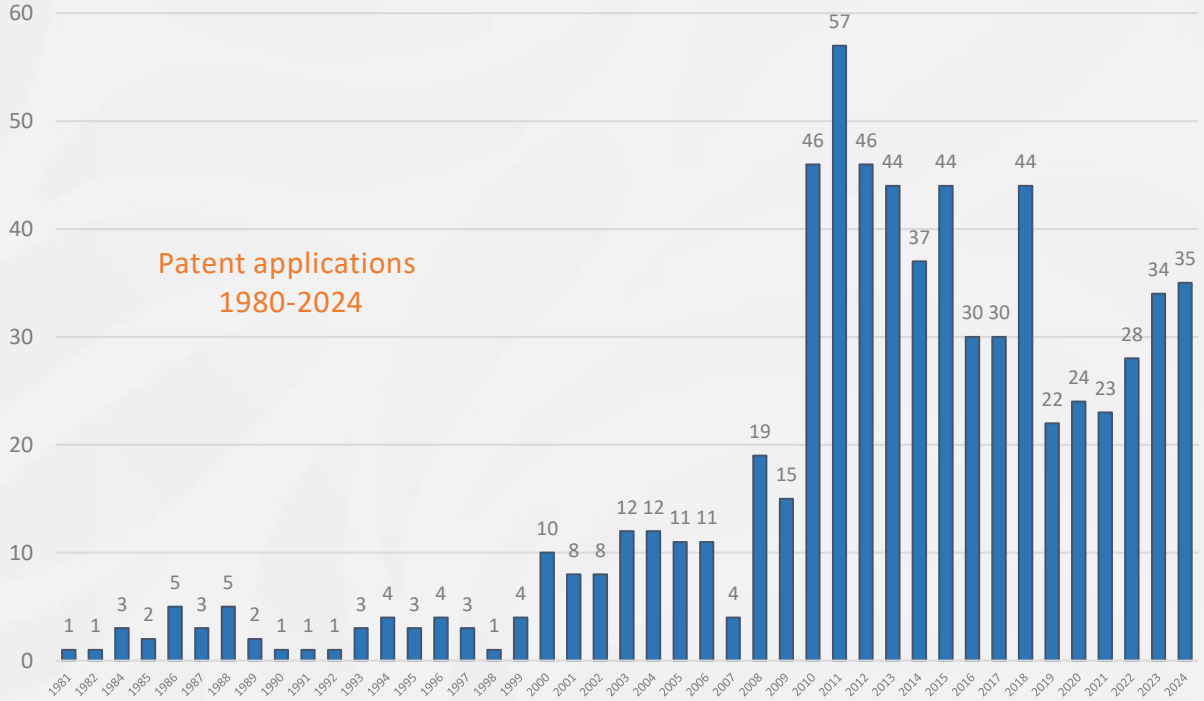
The **National Strategic Programs** in which federal and local government institutions and the scientific community participate, aims to find solutions to the country's most urgent problems. These programs have promoted technological development and innovation.

Cinvestav plays a leading role in collaboration and problem-solving due to the experience and knowledge it has acquired over time.

How do you support faculty and student innovators?

What opportunities are available to innovators from beyond the academic community?

Institutional support. Management of intellectual property protection, regulatory advice, and training on technological maturation of projects through innovation events organized by Cinvestav. These events provide opportunities for networking with companies, and with other institutions, not only from our community but also for innovators from other institutions.



Balance between generalized support and specialized programs.

As a public academic institution, the focus remains on **human resource training and basic research**. Within this framework, there is always an opportunity to do applied science or technological development as well. The support to do so is usually obtained through collaboration with the private sector or government institutions on a case-by-case basis.

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Innovation Challenges and Opportunities unique to the life sciences

Challenges

The complexity of implementing an innovation policy or program in less than 5 years, due to bureaucracy and changes in administration in public service.

The scarcity of resources, as the calls for funding are limited and only a few researchers are selected.

Aligning innovation objectives with research lines, intellectual property and transfer strategies, and the requirements for researcher incentives.

The strategic growth of the area dedicated to innovation management and technology transfer in Cinvestav.

Long and costly importation procedures

Restrictions to purchase computers, software and some chemical reagents

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Innovation Challenges and Opportunities unique to the life sciences

Opportunities

Researchers can adapt their research topic to the specific innovation challenges when necessary.

The possibility of establishing international collaborations and participating in Venture Capital rounds.

To create specialized programs aligned with innovation objectives for researchers including tailored intellectual property strategies and keeping researcher incentives.

To significantly increase and expand the capabilities of innovation and technology transfer activities in Cinvestav.

To create technology packages with research advances from complementary areas.

To improve importation procedures for scientific purposes.

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Key-differences in the regulation of technologies and products for the life sciences sector innovators in CA and MX

California and Mexico have robust regulatory frameworks (FDA and COFEPRIS) for the life sciences, but key differences to consider are:

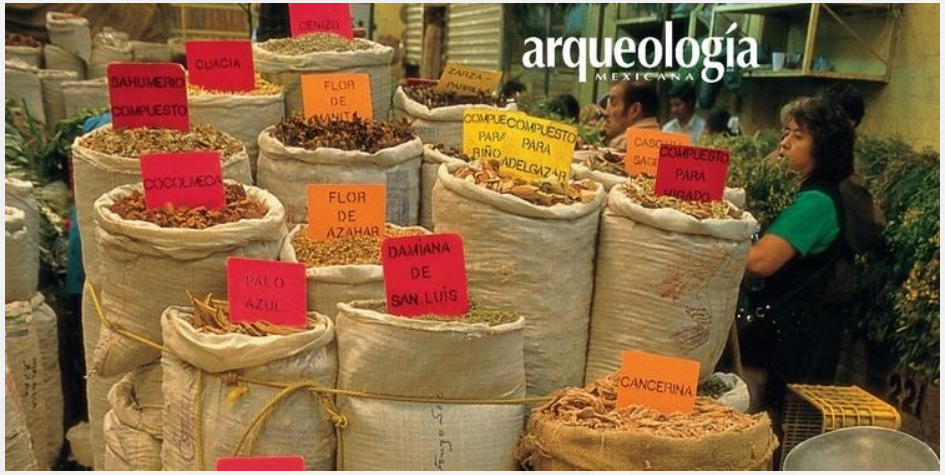
- Approval and Licensing process: **COFEPRIS'** approval often involves shorter timelines for some products such as medical devices and generic drugs.
- **FDA** regulation involves multiple steps, including several types of meetings according to the progress of the investigation, audits to non-clinical studies facilities, etc. For example, in **COFEPRIS** technical sessions can be requested during the process, and the non-clinical studies facilities are not necessarily audited for a specific guideline of GLP's like in the U.S, and the most important rigorous stage could be pharmacovigilance.
- Fees and Costs: lower fees in **Mexico COFEPRIS** compared to the **U.S FDA.**
- **FDA** is heavily involved in international regulatory harmonization while **Mexico** is increasingly harmonizing its regulations.

Examples of Projects: 1

Basic Research

from Natural

Products

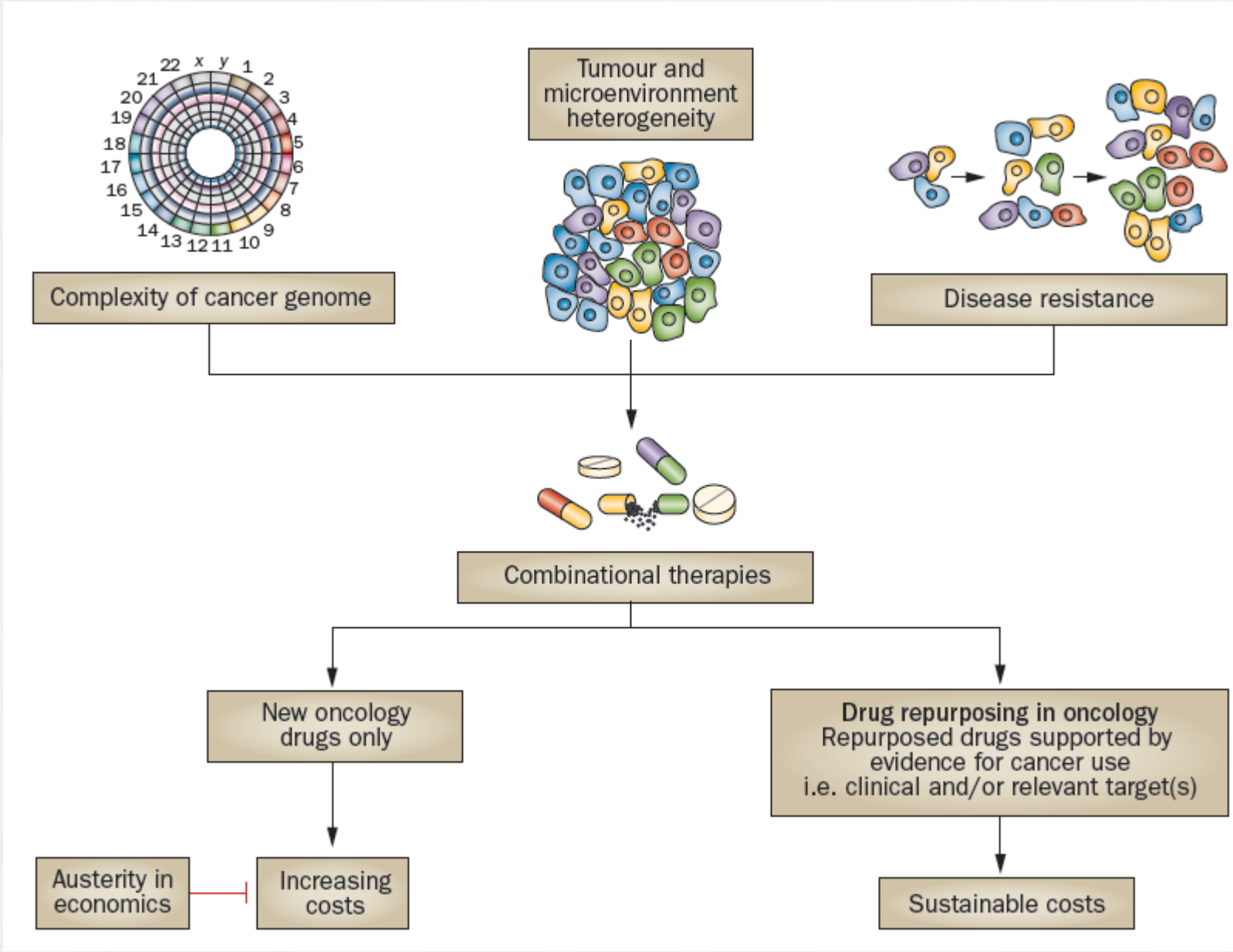


Basic Research from Natural Products

Challenges	Opportunities
The collection of the plants takes place in rural, isolated non-safe areas. The research team is exposed to assaults, violence, etc.	To establish specific natural protection programs
Some important expenses cannot be demonstrated because the farmers do not provide “offical” invoices	To support and legalize farms
The official authorization to collect plants in natural settings takes a very long time	To create research nurseries/farms

"Drug repurposing in oncology — patient and health systems opportunities"

***Examples of Projects*: 2**



Bertolini *et al.* Nature Reviews Clinical Oncology (2015), 12:732-742.

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Lower mortality in cancer patients who have used antihistamines

Adjusted HRs and 95% CIs for mortality of patients with any non-localized cancer and ≥1 prescriptions of indicated CAD antihistamines within six months after the diagnosis compared with those with ≥1 prescriptions of non-CAD antihistamines (cetirizine or fexofenadine). See also Supplemental Tables S3 and S6.

Drug	HR[a]	2.5%	97.5%	P	N
Astemizole					
All patients[b]	0.67	0.46	0.98	0.040	38
Clemastine					
All patients[b]	1.32	1.08	1.60	0.006	154
With chemotherapy[c]	1.51	1.07	2.14	0.020	45
Without chemotherapy[c]	1.37	0.87	2.17	0.177	46
Desloratadine					
All patients[b]	0.94	0.79	1.13	0.524	280
with chemotherapy[c]	0.79	0.61	1.02	0.071	123
without chemotherapy[c]	0.97	0.73	1.28	0.832	150
Ebastine					
All patients[b]	0.82	0.62	1.09	0.181	87
with chemotherapy[c]	0.81	0.43	1.51	0.505	18
without chemotherapy[c]	0.94	0.58	1.53	0.806	38
Loratadine					
All patients[b]	0.90	0.82	0.99	0.042	854
with chemotherapy[c]	0.76	0.63	0.93	0.009	209
without chemotherapy[c]	0.85	0.70	1.04	0.125	270
Terfenadine					
All patients[b]	1.00	0.83	1.20	0.988	166

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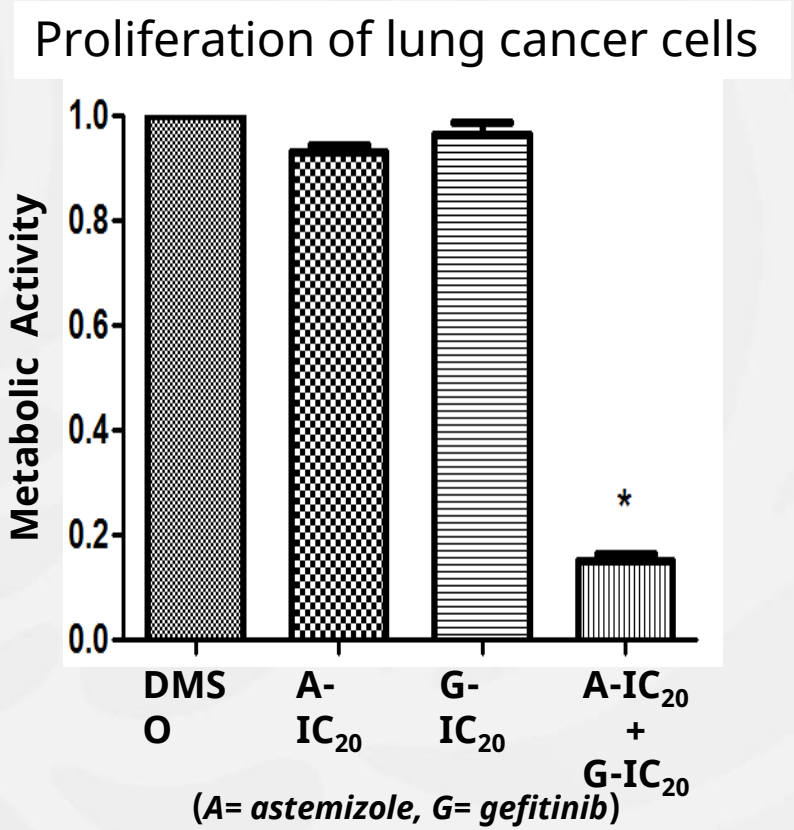
Modified from Ellegaard AM, *et al*. EBioMedicine. 2016;9:130-139.

Antihistamine-based drug combinations significantly potentiate the effect of anticancer drugs



Modified from Chávez-López *et al*. (2017). *OncoTargets and Therapy. 10:5795-5803*

Similar results studying double- and triple-drug combinations and repurposing in lung, liver, pancreatic and cervical cancer

Villarruel-Melquiades F. *et al.* In Vivo. 2023 **37**:1156-1163.

Martínez-Lira JL *et al*. In Vivo. 2024 38:2688-2695.

- Clinical trials
- More basic science projects looking for new targets for treatment and additional drugs for repurposing

Drug combinations and repurposing in concology

Challenges	Opportunities
The patents of many drugs to be repurposed are expired. Limited interest from some Pharma companies to support clinical trials.	To establish collaborations with the mexican Public Health System and institutions abroad
Basic science projects (new targets and treatments for several cancers) ~half a million usd To prepare new pharmaceutical formulations of drug combinations (several million usd) Patent transfer/licensing	To establish international collaborations including venture capital

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¡Muchas gracias!

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