

CANNABIS IN SLOVENIA - 70 YEARS 1945-2025

KONOPLJA V SLOVENIJI 70 LET 1945-2025

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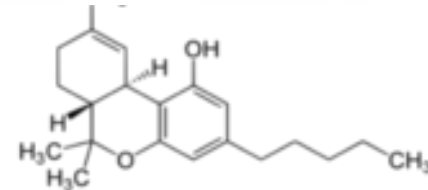


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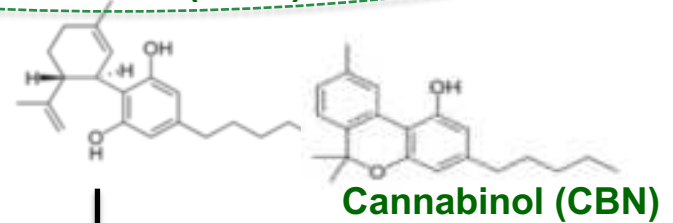
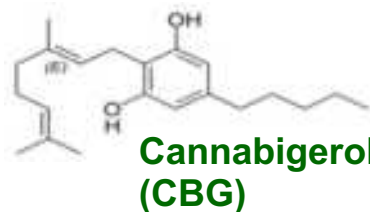
Historically
Cannabis Indica vs *Cannabis Sativa*

THC > 0.2 mg

THC < 0.2 mg



9-delta- Tetrahydrocannabinol (THC) Ratio
Cannabidiol (CBD)



Cannabis Flower /Flos
Full spectrum extract

Cannabinoids, terpenes
and flavonoid

EU-Pharmacopea -3028

EU Pharmacopea-3151

Numerous cannabis plant species are appearing
as breed hybrids with increasing **THC** = **the only psychoactive component**

Chemotaxonomic types:



*Moby Dick, White Widow,
Desert Queen, Dairy Queen, Eden,*



HISTORY OF CANNABIS PLANT IN SLOVENIA (1945-PRESENT)

- From **1945-1970**, hemp was primarily used **for industrial purposes** /fibers and oils/ in **Yugoslavia (export!) and Slovenia**. Medical use was overshadowed by laws targeting cannabis for its psychoactive properties.
- From **1970s -1990** even stronger restrictions : yet allowing for cultivation and processing of cannabis for industrial purposes, but **not for medical application-higher THC >02%-** was legally limited.
- **Early 2000s:** increased awareness of hemp's **medicinal properties** lead to efforts to legalize medicinal cannabis in Slovenia. Interest in **any cannabis-derived products as therapeutics use increased!!**
- **Even research** for industrial, agricultural or pharmacological applications are **highly supervised**, not welcomed and financed by public money!
- ✓ **2025: CANNABIS LAW – MODERNIZATION :**

SLOVENIAN SCIENTISTS NEED PUBLIC FUNDS TO FINANCE CANNABIS RESEARCH IN ALL R&D FIELDS RELATED TO CANNABIS

2500 b.c. – AFTER 5000 YEARS OF MEDICAL USE NEED

MODERNIZING LEGISLATION



Chen-Nung-China 2500 b.c.
Emperor of China



Far East to West



EMSO AWARD to OI- Dr. Josipina Črvek



- Dr. Josipina Ana Črvek is a renowned Slovenian oncologist.
Established Palliative care Department at IO
Pioneering the use of cannabinoid therapy in oncology



Today patients demand regulated clinical use and support medical
research to personalize their therapy
more in public vs private institutions

What would Hippokrates say?

Research Survey by Faculty of Health

80% of respondents support the use of cannabis in medicine, especially under doctor's supervision. **29%** oncology patients (out of cca **22 000/ 17.000/year**) use cannabis preparations, while 84% consider it difficult to obtain. Further 18% would use it if it were more accessible.

Among users, **82% assessed that cannabis has a positive effect** on their health or well-being. None of them were prescribed the products by a doctor and none are using official products, only CBD or illegal products. 47% of users talked about it with a doctor (Jožica Červek et al., 2020)

Use of cannabis products in **medicine has support among Slovenian population**. Use among oncology patients is **widespread**- without a doctor's supervision, with black market products: Prohibition treats patients like **criminals - against medical ethics!**

In Slovenia, cannabis based-medicine research & limited (RTC) **clinical trials** are slowly initiated. For runners known **Drs Neubauer David and Osredkar Damjan at Paediatric Clinic ,UMC Ljubljana**, carry on CBD -based treatment of Childhood Epilepsy



HISTORY OF CANNABIS USE IN MEDICINE IN SLOVENIA

- In 2013, Slovenia permitted the use of hemp derivatives like CBD for medical purposes
- and in 2017: Slovenia formally rescheduled THC, enhancing cannabis for medical use treating some indications such as cancer /chronic pain, and childhood epilepsy-
BUREAUCRATIC OBSTACLES BY JAZMP REMAINED
- 2010 -2020- Rather restrictive access to (THC) and medicinal cannabis (flower).
- From 2020, slow increase in controlled therapeutic use under medical supervision and controlled import of cannabis-based medicines R&D increase in medical applications research & industrial/agricultural use expanded. Today more patients demand regulated clinical application and support medical research to personalize the therapy - more in public than private institutions wanted.

Cannabis related R&D&I -companies in Slovenia

INTERNATIONAL The Talman Group, Ljubljana, connects global research teams to advance cannabis-related R&D International Collaborations. <https://thetalmangroup.com>

🌱 CULTIVATION AND PROCESSING COMPANIES > 5

- **CANNA CARSICA**
<https://carsica.si/>, Karst region : organic hemp cultivation, producing high-CBD and CBG flowers with less than 0.2% THC,
- **Agrosloven**
<https://agrosloven.com>, producing high-CBD and CBG flowers with less than 0.2% THC,
- **Hempika**
<https://hempika.com>, Nova Gorica, a variety of hemp products, organically grown hemp and modern extraction methods.
- **CANVORY Slovenia**
<https://www.canvory.si/>, wide selection of CBD and CBG products and even pet products, EU-certified/low THC content/ 0.
- **Phyto-Hemp**
<https://phyto-hemp.com/en/>, collaboration with IHPS in Slovenia, GACP-certified cannabis breeding station of advanced technology. They manage EU-BIO certified CBD outdoor plantations for scaling up production.

🧪 RESEARCH AND DEVELOPMENT > 8

- ✓ **Cebeden (Kanabinoidi d.o.o.)**
<https://cebeden.com>, Žalec, organic hemp extracts like drops and ointments- according to EU Pharmacopeia
- ✓ **Farmakem**
<https://farmakem.si/>, holds EU GMP and GDP for Solar system for active pharmaceutical ingredients, Cebexan™, a certified EU cGMP cannabidiol (CBD) API, and supply CBD to major health institutions in Slovenia.
- ✓ **PharmaHemp I and T&L (South Korean firm)**
<https://kanabi.si/pharma-hemp>, Offerings compliance support for innovative cosmetic products and collaborates with Jožef Stefan Institute and the University of Ljubljana,. PharmaHemp is also involved in clinical trials, on the treatment of spasticity in cerebral paralyses patients with UKC Ljubljana.
- ✓ **Biomons 1 d.o.o.**
<https://biomons.si>, Tabor, a family-owned company dedicated to providing high-quality CBD preparations based on research and innovation. They collaborate with Czech company CANNABIS Pharma, the traceability of raw materials and strict quality controls to ensure product purity and effectiveness.
- ✓ **Be Hempy (Argent BioPharma d.o.o.):** <https://behempy.com>, offers natural, safe products made from industrial hemp. Their range includes food supplements, cosmetics, and superfoods. Hand-harvested, pesticide-free hemp products and provides to customers their counseling center
- ✓ **Labiport (Aiport Tech d.o.o.)**
<https://labiport.com>, portable device for cannabinoid content analysis, ensuring at the spot product quality
- ✓ **Nabie, Pharma G d.o.o.**
<https://nabie.com>, offers premium CBD-infused cosmetics and dietary supplements. The brand emphasizes clean, non-toxic formulations that combine science and
- ✓ **Plan Z, d.o.o.**
: <https://planz.si>, Ljubljana, biotech SME for advanced plant-based technologies, focusing on enhancing cannabis cultivation through research and innovation

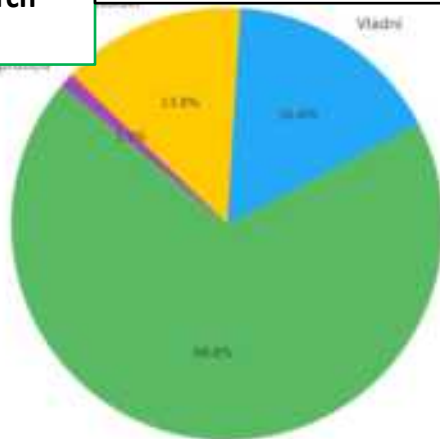
Good climate for business : **NOW**

Total R&D financing From ARIS- Research Agency by the sectors :

High education 13,8%

Private research
sector 1.2%

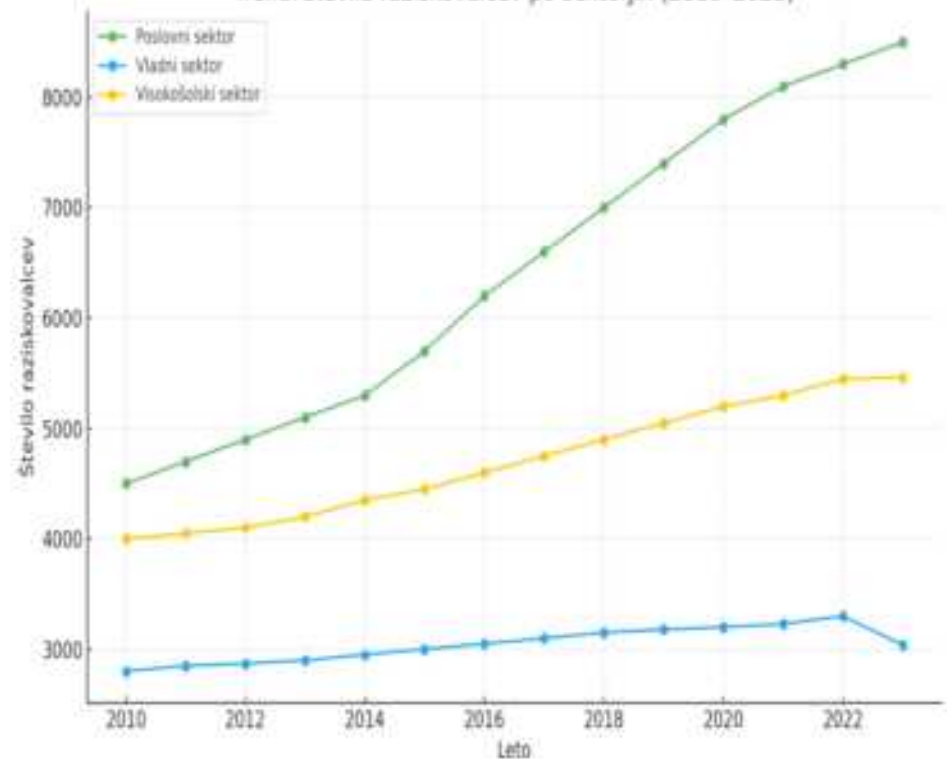
Governmental Institutes 16,46 %



68,8% BUSINESS

The **researchers employment in business section** is increasing fast from 2014..

Trendi števila raziskovalcev po sektorjih (2010-2023)



TTG Networking among R&D institutions experimenting with cannabis in Slovenia - Letters of Intent

1. Universities and Higher Education Institutions:

1. **University of Ljubljana:** The oldest, comprehensive university in Slovenia
 1. **Medical School**
 2. **Faculty of Chemistry and Chemical Engineering**
 3. **Biotechnical Faculty**
2. **University of Maribor-Medical school**
3. **University of Primorska** Offers interdisciplinary research opportunities
4. **University of Nova Gorica** Focuses on distinct fields in natural sciences, humanities, and engineering.
5. **Novo mesto Landscape Governance College GRM**

2. The Major Public Research Institutes (out of 16):

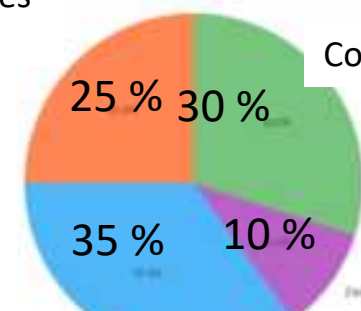
1. **Jožef Stefan Institute (IJS):** Slovenia's leading PRI, physics, materials science, and information technology.
2. **The Agricultural Institute of Slovenia**
3. **Slovenian Institute of Hop Research and Brewing:** hop growing, brewing technology, and plant protection.
4. **National Institute of Chemistry (NIC):** Specializes biological and biochemical research.
5. **National Institute of Biology (NIB):** Conducts research in biology, genetics, and biotechnology.
6. **Institute for Economic Research (IER):** Focuses on economic and social sciences research.

3. Research Centers and Clusters:

1. **Center of Excellence for Biosensors, Instrumentation and Process Control (COBIK)** biosensors and instrumentation.
2. **Center of Excellence for Low-Carbon Technologies (COINCET):** Sustainable technologies research

Universities

Struktura raziskovalnih ustanov v Sloveniji



Companies

Public research and private institutes

These institutions carry on and collaborate on national and international projects, focusing on innovation, technology and sustainability. Letters of intent with TTG

Consortium for Cannabis CONCAN - at TTG

CONCAN MISSION

- We aim to create **transformative solutions** that enhance **quality of life** and foster **economic growth** and
- To **drive technological advancements by connecting research teams and small and medium enterprises**, companies and corporation to innovative cannabis-based products to **improve health and therapeutic approaches** in certain disease states.

CONCAN VISION

- Be the **trusted bridge to opportunities** in the cannabis industry by **uniting like-minded stakeholders** in Slovenia.
- **Long-term vision of CONCAN is to become major public -private institution of immense regional impact on cannabis health and medical science and technology, spreading the cannabis plant regionally and in Europe.**

CONCAN as HEALTH SRIP

Strategic Development and Innovation Partnerships Slovenian Innovation Hub and European Economic Interests Group

Partners

- **Slovenian Institute of Hop Research and Brewing (IHPS)**
- **Jožef Stefan Institute, Dept of Environmental Sciences (IJS)**
- **Biotechnical Faculty, University of Ljubljana BF-UL**
- **Childrens Hospital of the University Medical Centre Ljubljana (PD-UKC)**
- **Medical Faculty of University of Ljubljana (MF-UL)**
- **Medical Faculty of University of Maribor Ljubljana (MF-UM)**

Workpackages

WP I.

- ✓ Cultivation and Agronomic Impact

WP II.

- ✓ Environmental Services of Cannabis

WP III.

- ✓ Breeding new varieties of Cannabis

WP IV.

- ✓ Natural products from the plant *Cannabis sativa* L. - Extraction, Processing, Manipulation and Analytics

WP V.

- ✓ The Impact of Biological Activities of *Cannabis* L. *indica* Compounds on Human Health: Cancer and Neurological disease.

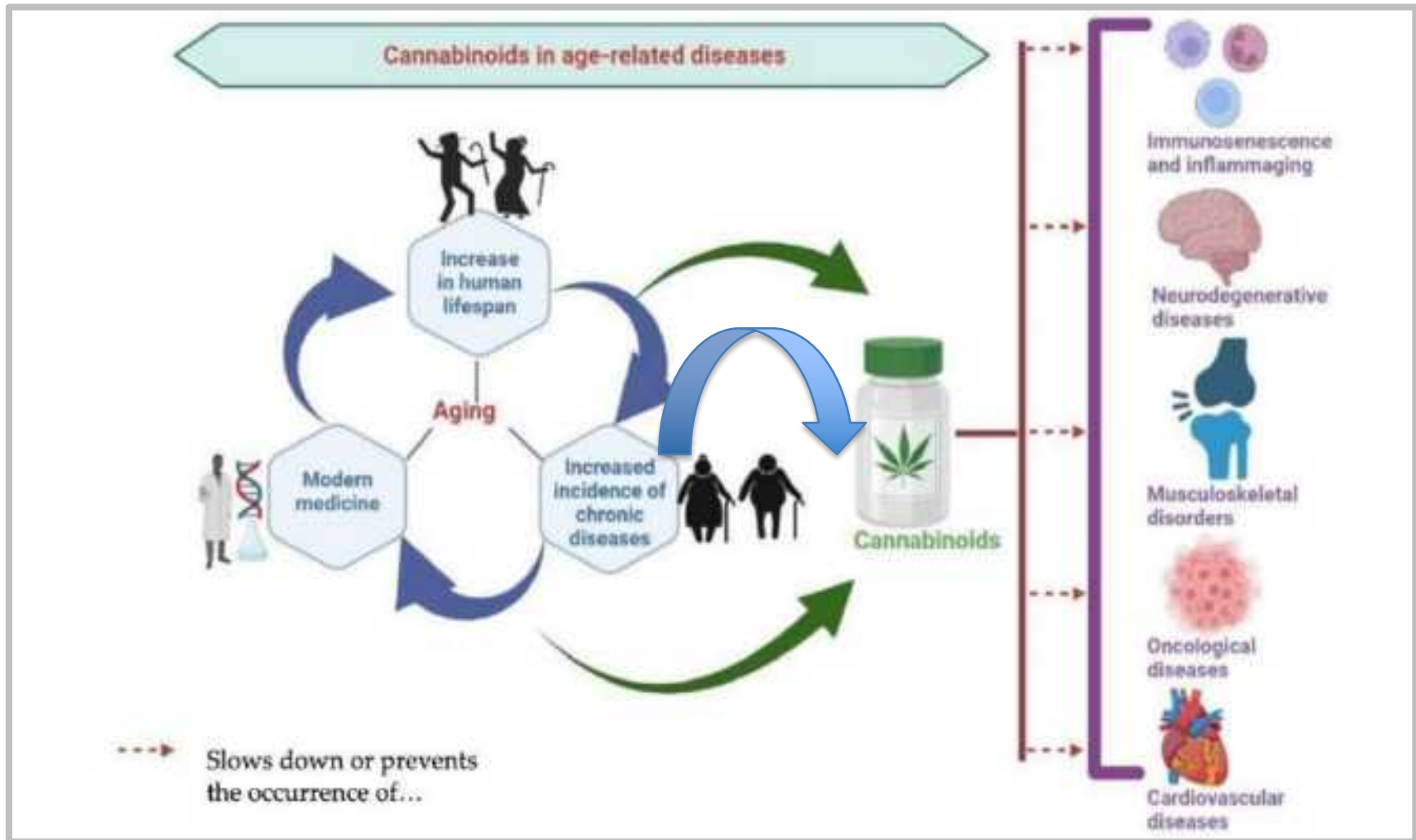
Consortium for Cannabis CONCAN - at TTG

Consortium CONCAN – HEALTH (human and environmental)

The AIM is to bridge between the cannabis science and pharmaceutical and biotechnological products through innovative applied R&D:

- Through enhancing the **biodiversity of cannabis plants** we aim to **improve agriculture and ecosystem services** (by comparative analyses of cultivation) **for better sustainability**.
- To be used **in phyto-remediation** for reducing toxins and pollutants from agricultural soils and broader ecosystems.
- **Novel agro-technologies**: new cannabinoid formulations (including medical cannabis Flower), to impair the progression of most aggressive diseases:
- **Medicinal cannabis** use in specific types of **cancer, neurodegeneration, multiple shlerosisn** (Depending on the health institutions included in Slovenia and abroad..
- **Specific application of cannabinoids (CBD) related to aging process itself**.

Cannabinoids in healthy aging and age-related diseases



CONCAN PROJECT LEADER :IHPS

Research of industrial hemp - outdoor cultivation.

Three different varieties of hemp based
on chemical profile:

Carmagnola selected (CS)

- Higher total CBG (1.45%)
- Higher content of β -caryophyllene, α -humulene
- Higher content of α -pinene, β -pinene, terpinolene
- Higher total CBD

Tiborszallasi

- Higher content of myrcene
- THC:CBD ratio 1:22
- THC:CBD ratio 1:21
- Higher total CBD
- Higher content of α -pinene
- THC:CBD ratio 1:2
- Chemotype II
 - Higher content of myrcene

Selection of Finola

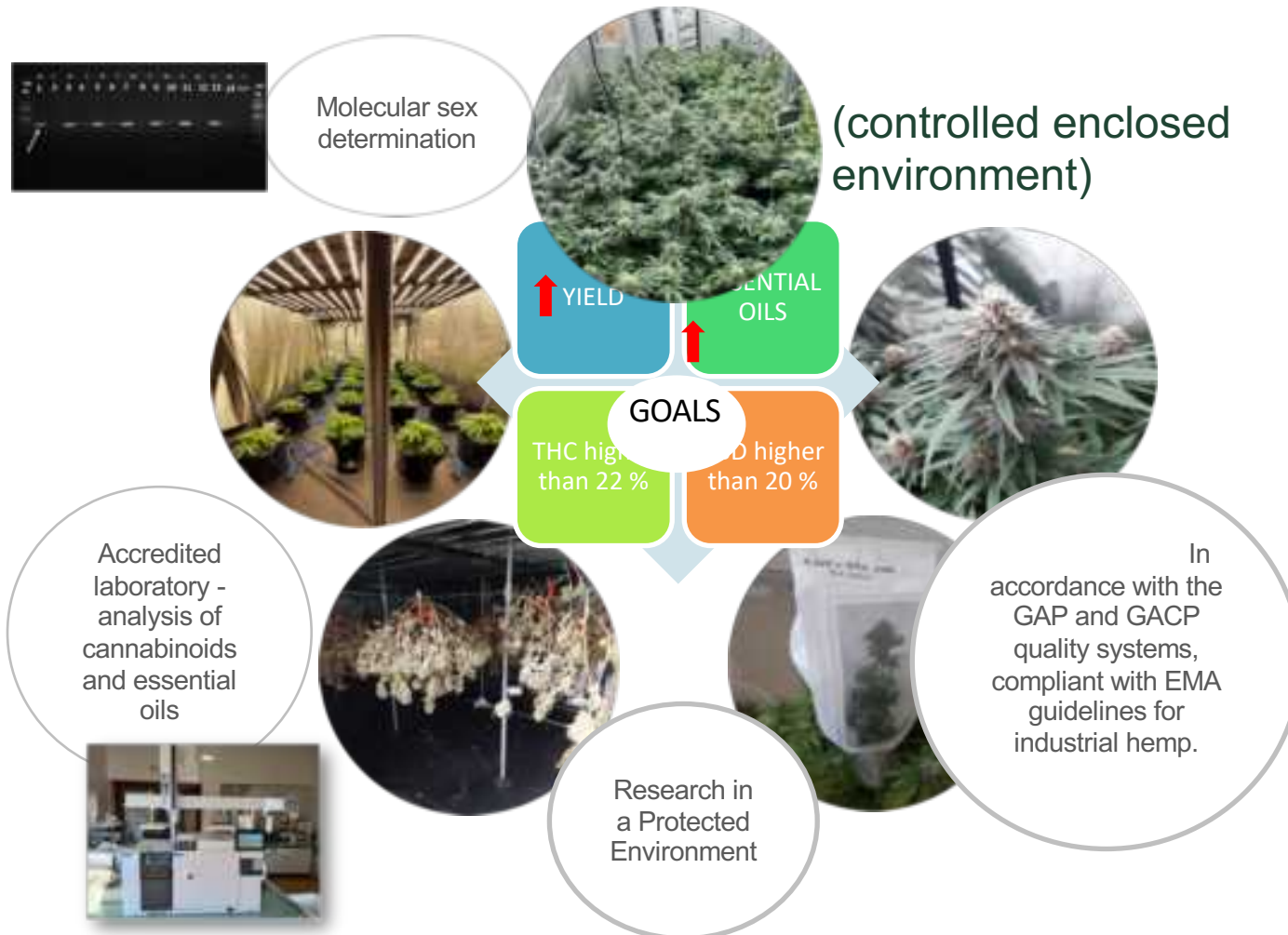
- Equal chemotypes at the chemical level
- Higher total CBD compared to other varieties
- Higher content of limonene, α -pinene and β -caryophyllene

Ministry of
Agriculture
initiative

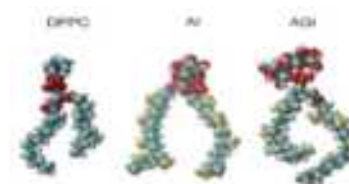
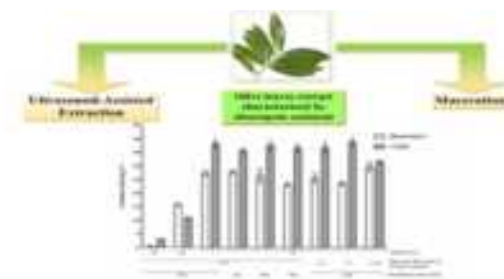
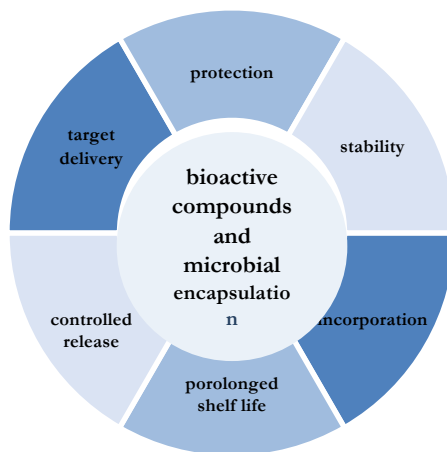
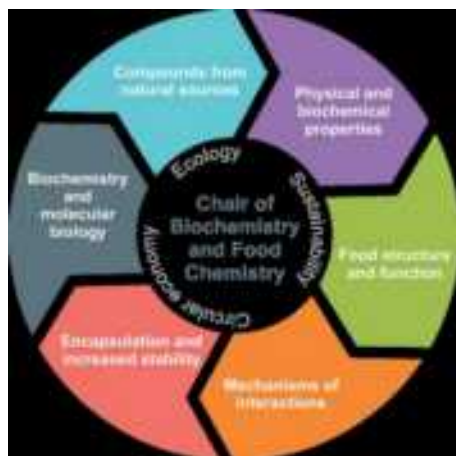


IHPS research of medicinal a cannabis

- **New hemp varieties** with higher content of CBD/THC/CBG/essential oils
- **Outdoor cultivation for medical purposes**
- Breeding of **new Slovenian hemp** varieties



Biochemical and biophysico-chemical characterization of natural compounds





Centre for human molecular genetics and pharmacogenomics

*Faculty of Medicine
University of Maribor*

Head:

Full prof. dr. Uroš Potočnik

Staff:

7 researchers with PhD

3 junior researchers

2 technicians



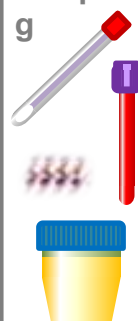
*Find
out
more!*



Chronic immune diseases, Cancer & More

Personalized medicine

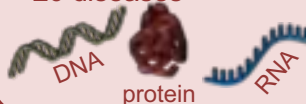
Bio-sampling



Blood, Urine, Biopsy, Swab, Brush, etc.

Biobank

>20.000 samples
>7.000 patients
>500 healthy controls
>20 diseases



Characterization & Isolation of specific cell types

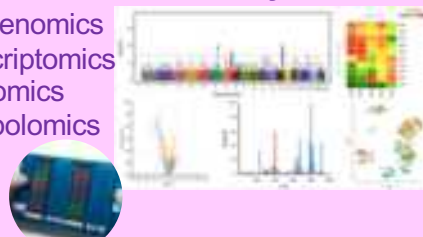


FACS, MACS,...

System medicine

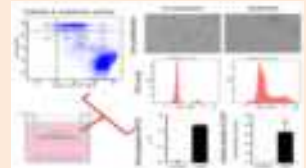
Multi-omics analyses

(epi)genomics
transcriptomics
proteomics
metabolomics



In vitro cell models & Functional validation

primary cells (& cell lines)



Bioinformatics & Predictive models

integration of multi-omics data



machine learning



Patient endotypes, Predictive markers

Which patients are eligible for complementary cannabinoid treatment?

Standard treatment +/- Cannabinoids

Does complementary treatment exceed standard one?

Find out more!



The National Institute of Biology (NIB)

is a public research institute, established formed by the Government of RS with the following intentions:

- Creation of new fundamental knowledge in the field of biology and related natural and environmental sciences.
- Transfer of this knowledge to use with the intention of improving the quality of life, of supporting the environmental policy, and of development in biotechnology



At the Department of Genetic Toxicology and Cancer Biology

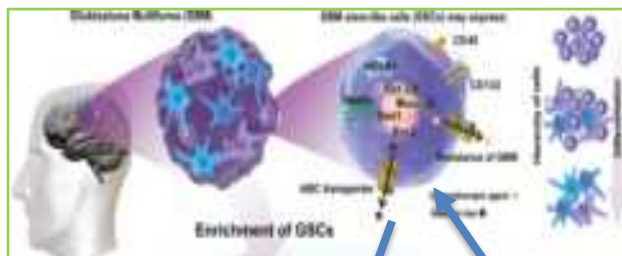
the research is being carried out in ecotoxicology, genetic toxicology and cancer biology.

The damages of genetic material and the origin and development of cancer diseases and therapy by phytopharmaceuticals. .

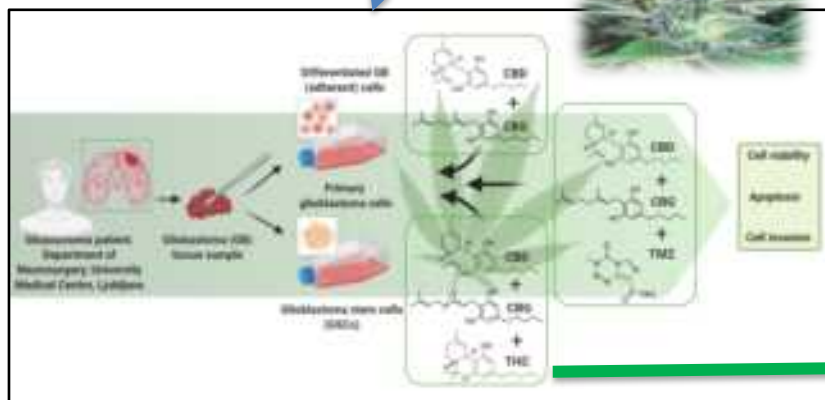
DEPARTMENT of GENETIC TOXICOLOGY & CANCER BIOLOGY



PROGRAMME



BRAIN TUMOUR
GLIOBLASTOMA



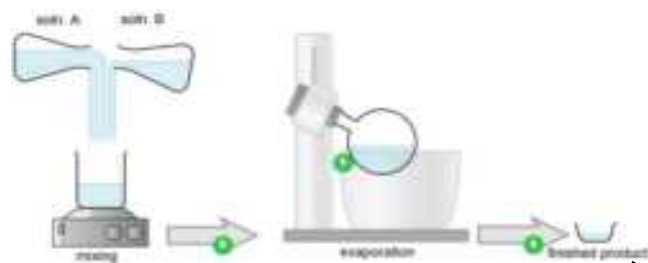
BARBARA BREZNIK,
META NOVAK, BERNARDA
MAJC, ANAMARIJA HABIČ
, & students



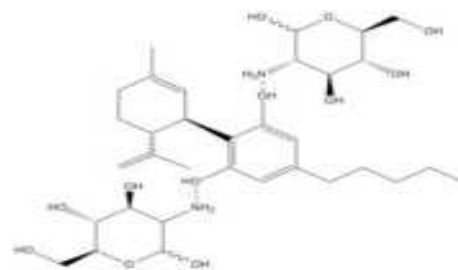
Combination-complementary therapy of
Glioblastoma to standard therapy

Preparation of effective cannabinoid mixture
for each patient, targeting cancer stem
cells-personalized therapy

DEPARTMENT of ANALYTICAL CHEMISTRY – LABORATORY for FOOD CHEMISTRY – L06



Process schematics for water-soluble CBD



Glucosamine-CBD water-soluble
complex



the L06 team

RESEARCH AREAS:

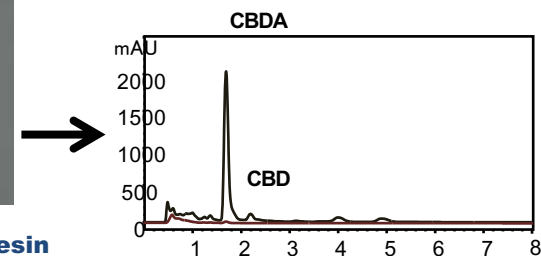
- synthesis of water soluble and more stable forms of natural compounds, e.g. CoQ10, CBD, carotenoids,...
- permeability studies
- bioavailability studies
- studies in plant chemical defence mechanisms
- analytical studies of environmental samples
- phytochemical analysis



Water solubilisation of normal hemp resin
(left) and GA-modified soluble resin
(right)

analytical techniques expertise:

- HPLC, LC-MS
- TLC
- GC, GC-MS
- IC
- elemental analysis, laser ablation,...



in partnership with:



FUTURE OUTLOOK

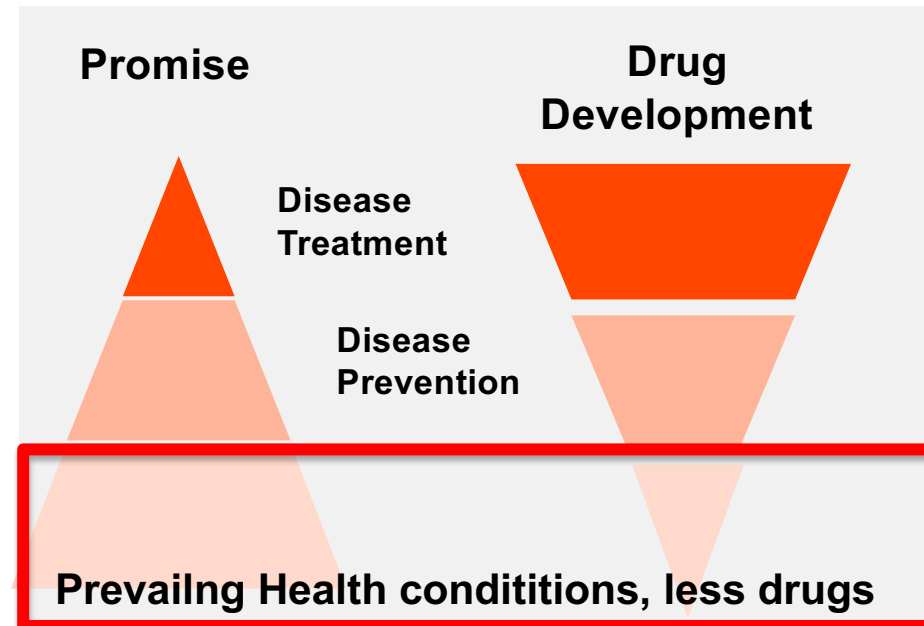
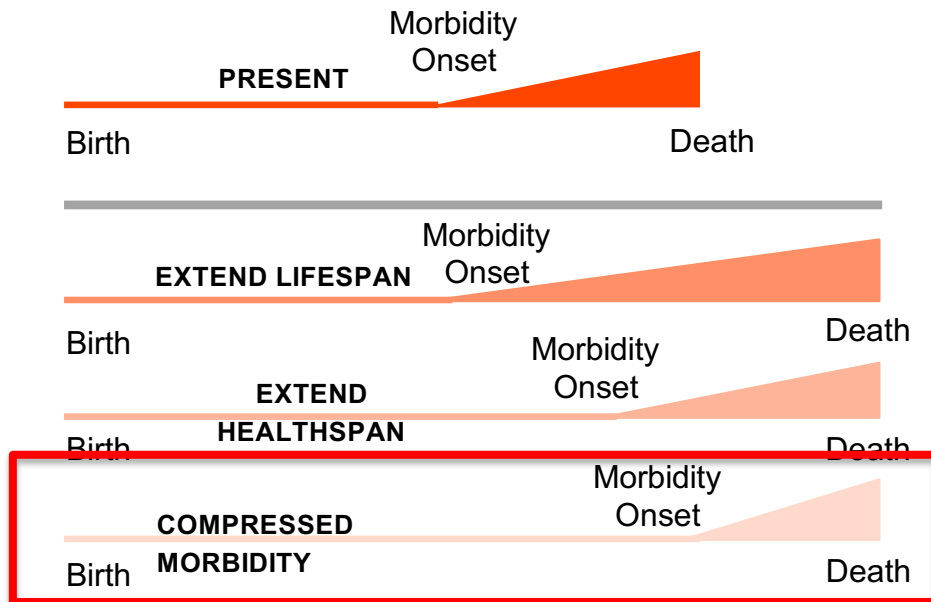
To further develop the hemp sector in Slovenia, the key strategies include:

1. **Simplifying legislation** – clear distinction between industrial and psychoactive use, harmonized rules for cultivation, processing, and sales. **NEW Legislation!**
2. **Developing (medical) cannabis processing infrastructure** .
3. **Strengthening producer cooperation** – forming cooperatives, clusters, or brands to improve competitiveness.
4. **Supporting research and innovation** – especially in bioplastics, insulation materials, and functional foods.
5. **Targeted export strategy** – building brand recognition for Slovenian products in foreign markets, especially within the EU.

With a thoughtful approach, state support, and cooperation among farmers, entrepreneurs, and scientists, Slovenia has every opportunity to reestablish hemp as a vital and sustainable economic resource for the 21st century.

Anti-Aging Strategies

Compressed morbidity = decrease in the period of chronic diseases



By manipulating the pathways that underlie and promote aging, researchers hope to **extend health-span**, the disease free and highly functional period of life = compressed morbidity

Thank You for Your Attention!



**Traditional cannabis growing
regions in Slovenia**