

Project № BG05M2OP001-1.002-0005

Personalized Innovative Medicine (PERIMED)



Competence Center - Results and Planning



**Establishment under Operational Program “Science and Education for Smart
Growth” 2014 – 2020,
with the financial support of the European Regional Development Fund**



CENTER OF COMPETENCY – PERIMED

November 29, 2022

European Project № BG05M2OP001-1.002-0005:

CENTER OF COMPETENCY „PERSONALIZED INNNOVATIVE MEDICINE” – PERIMED

PARTNERS

- The Medical University in the City of Plovdiv
- The University of Plovdiv “Paisii Hilendarsky”
- Institute of Applied Mineralogy - BAS





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SCIENTIFIC PROGRAMS / WORK PACKAGES

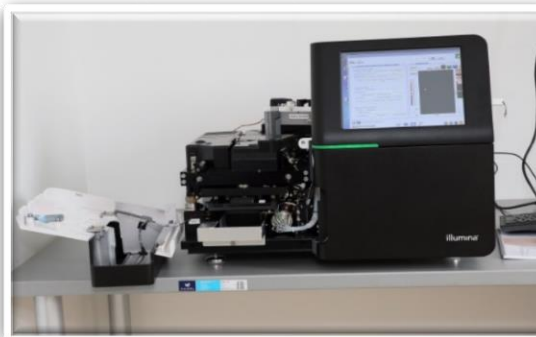
WORK PACKAGES (WP)	THEMATIC FOCUS OF RESEARCH
MU-Plovdiv – 6 WP	Oncological diseases; Molecular Genetic Diagnostics in onco-hematology; Medical applications' molecular biomarkers; Critically ill patients; Drug-Delivery Systems for Targeted Effect of Drugs and Personalized Medicine
Plovdiv University – 5 WP	Biocatalysts and natural biologically active substances; Biopolymers and new materials; Biosensors
Institute of Mineralogy & Cristallography – 1 WP	Physic-chemical control of innovative drug formulations



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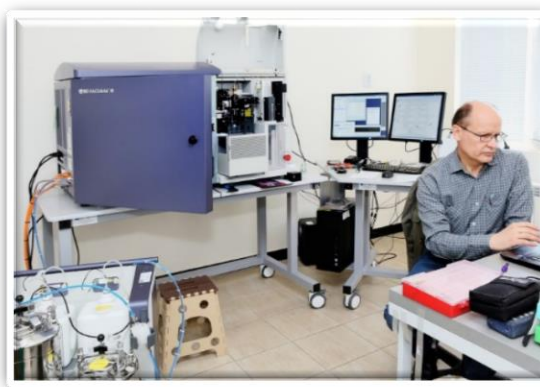
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Laboratory: Molecular Genetic Analysis



Platform for conducting high-sensitivity digital emulsion PCR for early detection and monitoring of free-circulating and cell-based biomarkers in tumor, viral and immune diseases

Laboratory: Flow cytometric monitoring of minimal residual disease in children with acute lymphoblastic leukemia and provision of high-purity cell populations for specialized molecular genetic and pharmacotherapeutic in vitro cell sorting



WP5. Complex system for monitoring and personalized approach to critically ill patients.



Bioimpedance monitor



Patient monitors



Portable patient monitor for vital parameters

Laboratory “Drug-Delivery Systems for Targeted Effect of Drugs and Personalized Medicine”





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LABORATORY: Molecular biomarkers for the GIT microbiota

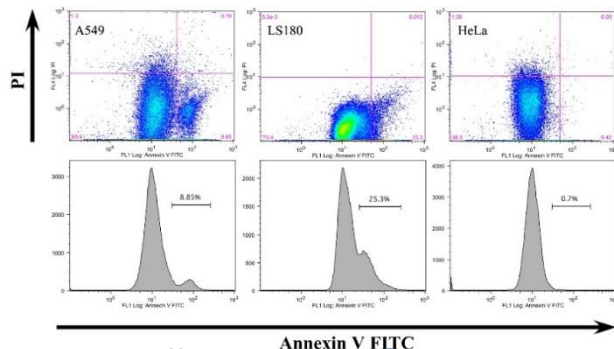


IN VITRO GIT SYSTEM FOR PRE-CLINICAL STUDIES



Investigations on prebiotics are related mainly to their influence on the gastro-intestinal tract and on the serum lipids and carbohydrates.

LABORATORY: Immunobiomarkers for tumor and autoimmune diseases



Key objectives:

- Investigation of the immunological and biochemical profile of patients with autoimmune and tumor diseases.
- Development of specific biomarkers for diagnosis, prognosis and prediction of autoimmune and tumor diseases.
- Development of new approaches and potential tools for an effective personal therapy.

Apoptotic effects of anti-CLDN12 antibodies on A549, LS180, and HeLa cells.



Laboratory: Biocatalysis and natural bioactive substabces

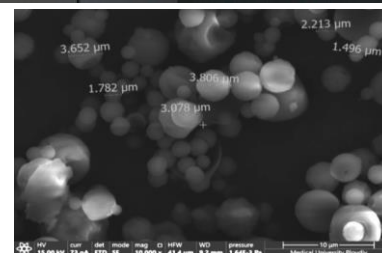


LABORATORY: Biopolymers and new materials

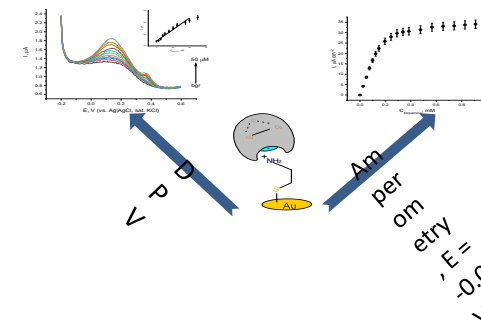


Laboratory: Biosensors

Microgel particles from kasein



Aim:
The development of biosensors, in which biochemical are integrated with an electrochemical sensor/actuator



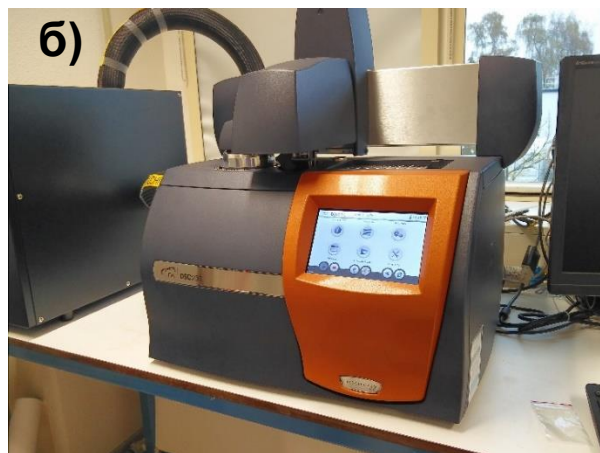
AT THE INSTITUTE OF MINERALOGY AND CRYSTALLOGRAPHY, BAS, SOFIA

Laboratory

Laboratory for physicochemical characterization of medicinal substances;
Planned equipment: BGN 1.4 mln.

Equipment

- X-ray diffractometer;
- Differential Scanning Calorimeter (DSC);
- Isothermal Titration Calorimeter (ITC);
- System for determination of specific surface area and size of pores (BET), etc.



Differential Scanning Calorimeter
X-ray diffractometer



c) System for determination of specific surface area and size of pores



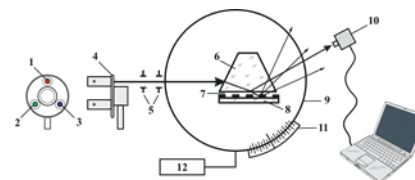
PATENTS:

SYNTHESIS OF WATER INSOLUBLE GLUCAN POLYSACCHARIDE BY TRANSFERASE ENZYME REACTION



DISCRIMINATION OF SWEETENERS BASED ON THE REFRACTOMETRIC ANALYSIS

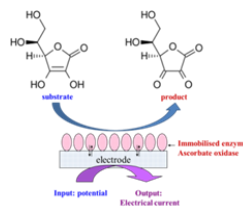
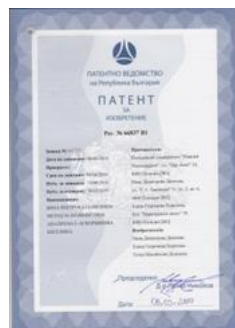
UTILITY MODEL BG 2842 U1 UNIVERSAL LASER MICROREFRACTOMETER



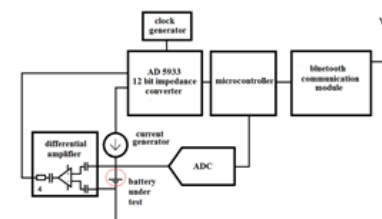
Instrument for measuring voltage and internal resistance of batteries



Bioelectrocatalytic method for quantitative analysis of L-ascorbic acid BGPatent No 66837 B1 / 28.02.2019



The developed device is registered as a utility model by the Patent Office of the Republic of Bulgaria with registration document № 2647 / 06.07.2017





PUBLICITY, INFORMATION AND COMMUNICATION

The **wide public response** and **interest** showed that **we are on the right track** in our implementation and our efforts are not in vain. We will continue with even greater ambitions until 2023.

Two of the inventions won awards for the **most innovative inventions** in the field of Biochemistry, Biophysics and Medicine:

- ▶ *Bioelectrochemical Method for Quantitative Analysis of L-Ascorbic Acid (Vitamin C);*
- ▶ *Preparation of water-insoluble glucan through a transferase enzyme reaction.*

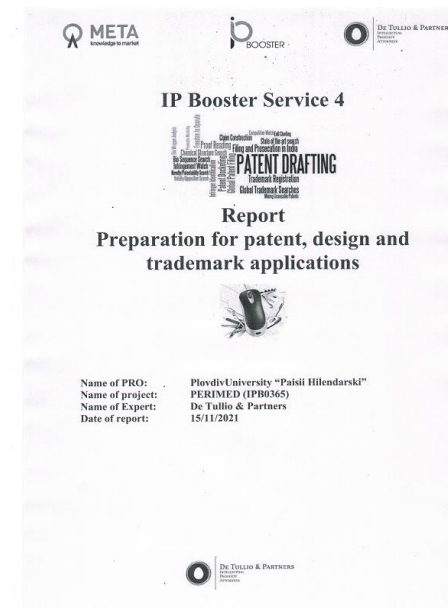


https://youtu.be/cHzZtrU_xPU



• Team Progress

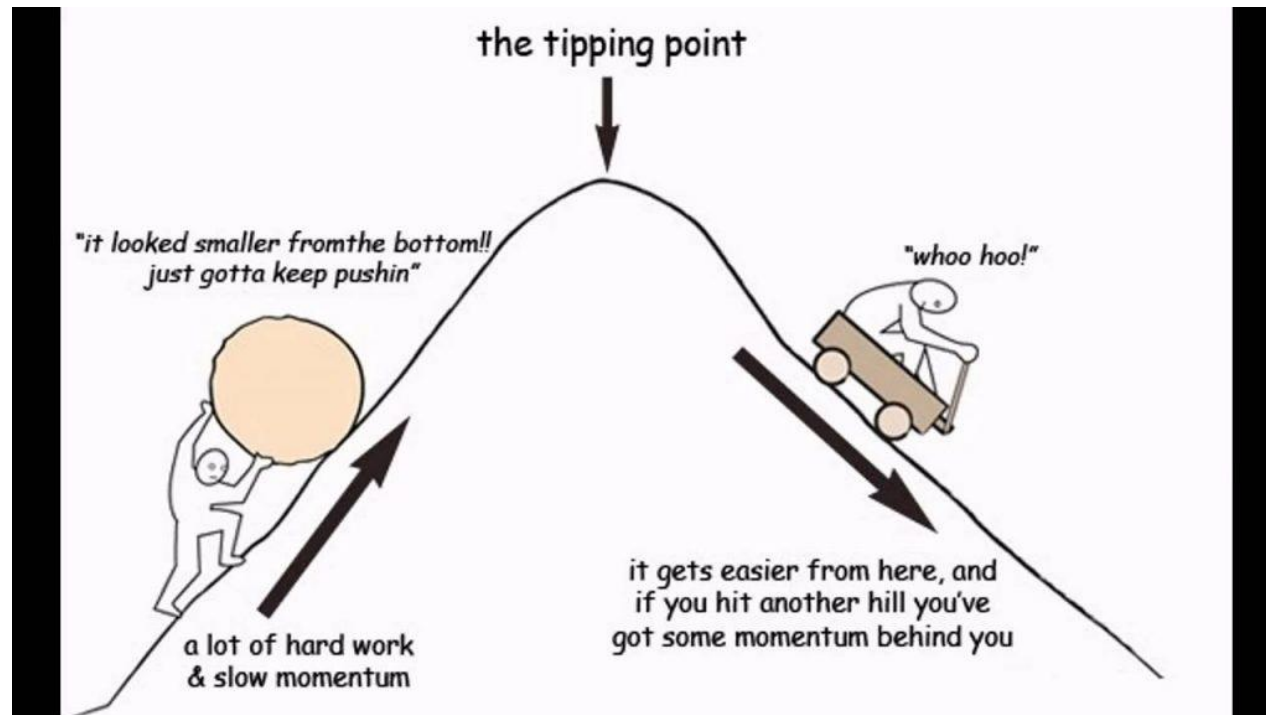
- What were your plans, what you managed to do, your key findings, hypotheses validated/changed/need more testing, did you have to pivot?
- MVP development status;
- Market size, market type, competition (updated if there are changes based on your work and findings);
- Challenges; important successes and milestones achieved;
- What have you learned so far;
- Next steps that you are planning.





Have we reached the “Tipping point”?

- Malcolm Gladwell's 2000 bestselling book [*The Tipping Point: How Little Things Can Make a Big Difference*](#)
- a point in time when a group rapidly and dramatically changes its behavior by widely adopting a previously rare practice
- a process in which, beyond a certain point, the rate of the process increases dramatically





INTEREST IN THE CENTER

- **National Roadmap for Research Infrastructure** – invitation for membership and application submitted.
- **Scientific collaboration** with researchers at the **BioActiveMed National Scientific Program** in the development of new biologically active substances with antitumor effect (*MU-Plovdiv /Chemical Sciences Department/ is a partner in the Program*).
- **BioMerieux International Network** – monitoring of the frequency of intestinal, respiratory, blood infections – for immunological and molecular biological studies in patients with malignancies and comparative analysis of data.
- **European Translational Medicine Infrastructure EATRIS-ERIC** – invitation to join an 80-member consortium for innovative strategies and approaches for prevention, diagnosis and treatment.
- **European Network of Clinical Research Centers for Personalized Medicine, Oncology, Targeted Drugs and Biosensors – PathFINDER**

from the University of Dundee, Scotland.



OPERATIONAL PROGRAMME
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Sustainable SCM

Change in Consumer Behavior and Demand

Sustainable Production

Social Economic Impacts

Fair Traded Products

Organic Products

Climate Change

Climate Neutral Production

Human Rights

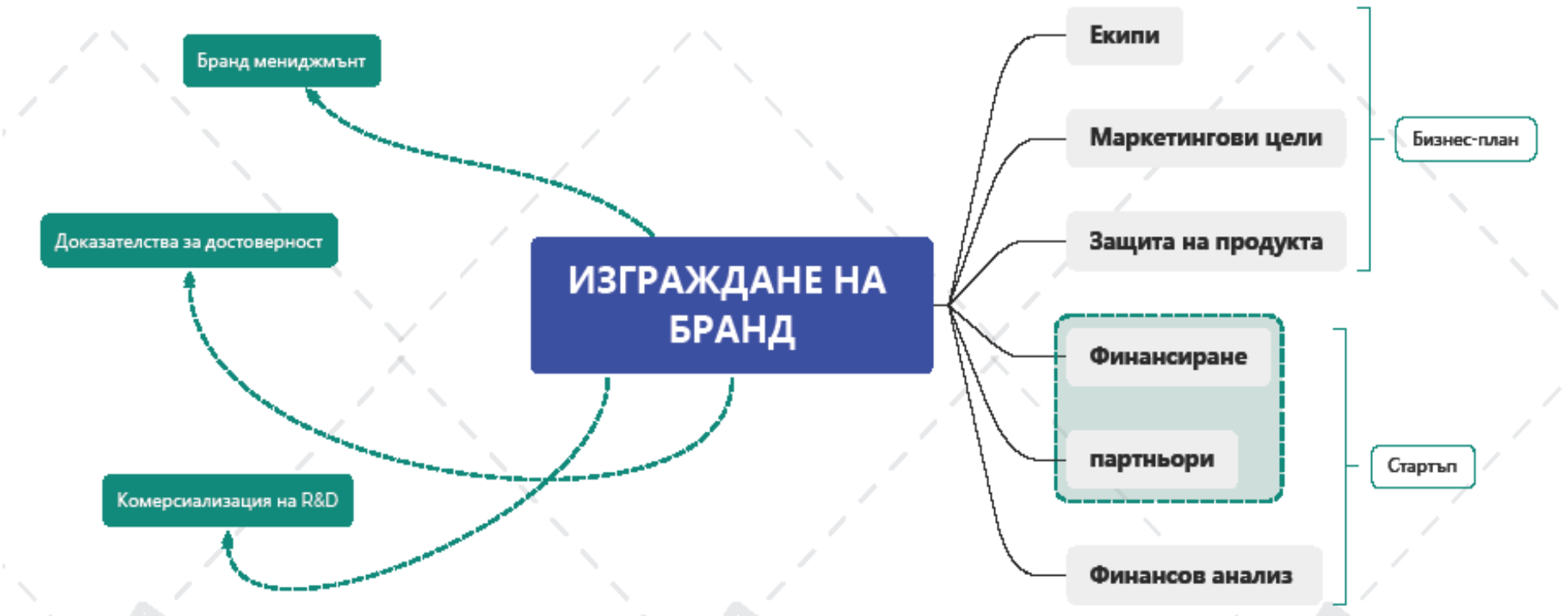
Save Products



РАЗПОЗНАВАЕМОСТ НА ЦЕНТЪРА

Центърът има две компоненти за устойчиво развитие:

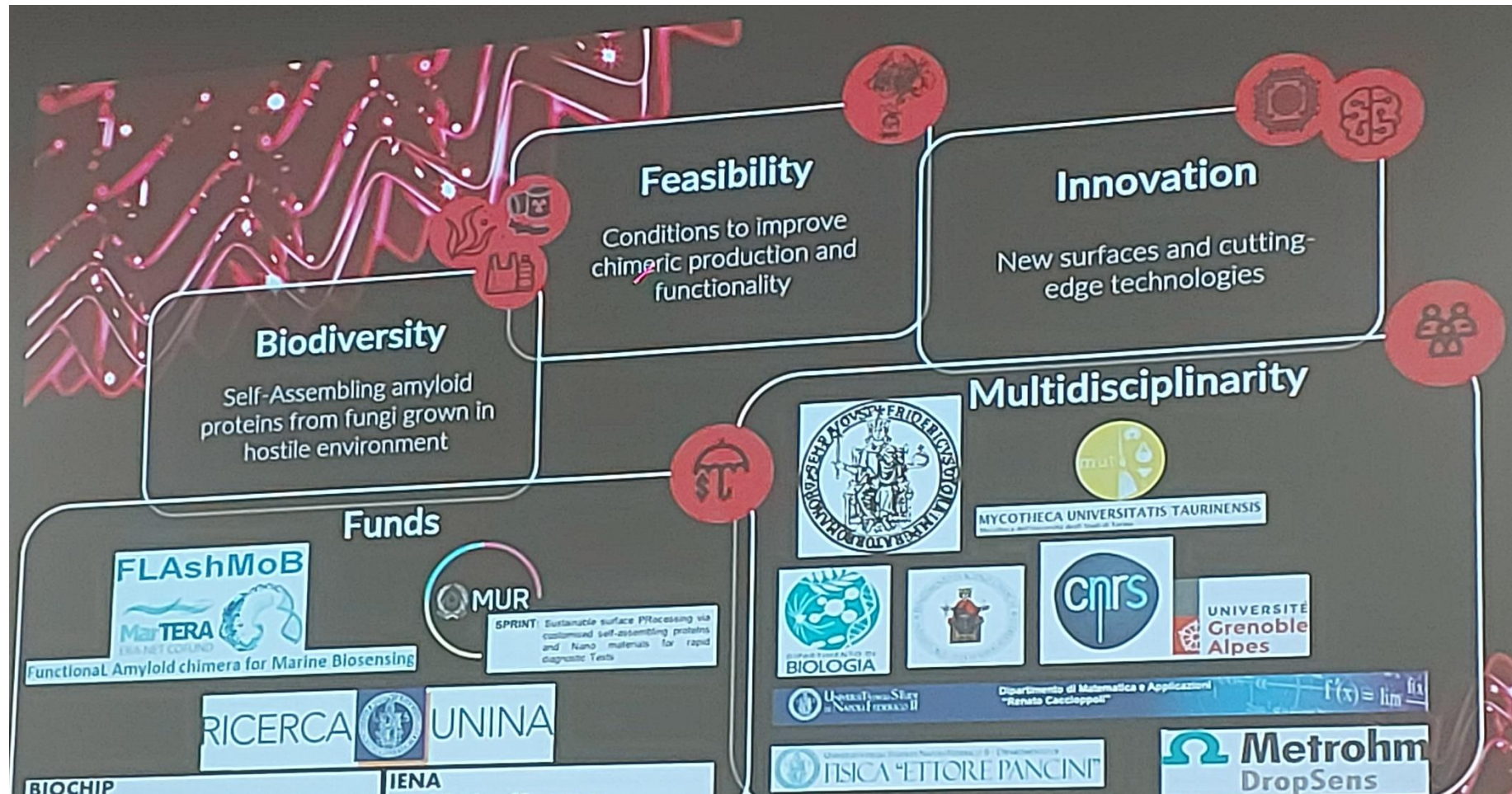
1. Развиване на иновативна изследователска програма на ниво ЕС (R&D продукт);
2. Развиване на **стартиращи компании** за промотиране на собствените постижения към бизнеса и последващото им продаване на големи фирми





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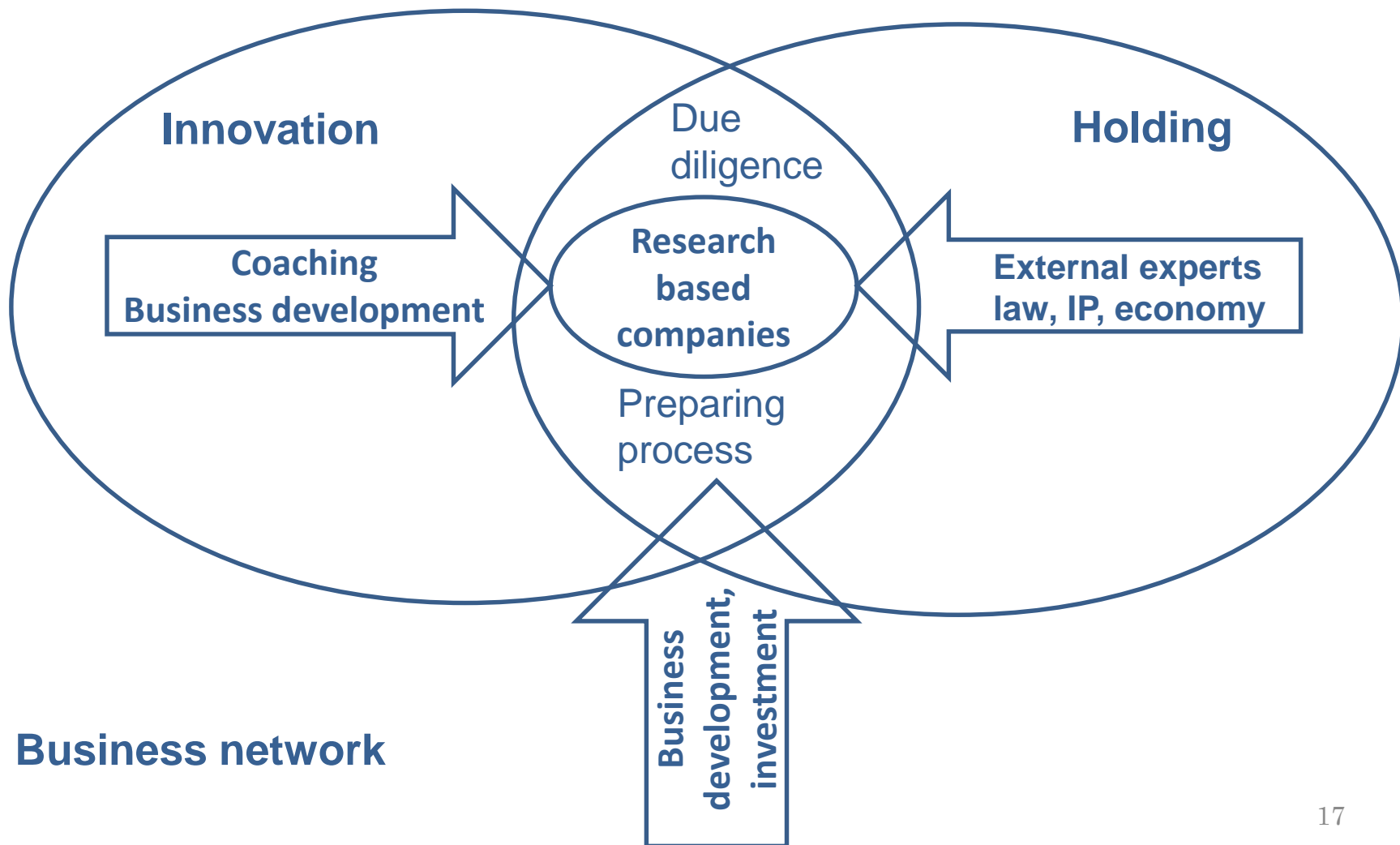
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	United States	EU-27	Japan	China	South Korea	United Kingdom
Internet, software, hardware (Google, Apple, FB, Amazon, Samsung)	114	9	9	15	17	1
Semiconductors (Intel, NXP)	39	5	3	1	2	0
Biotech (Celgene, Abbvie, Gilead, Amgen)	35	4	0	0	0	0
Pharma (Roche, J&J, Merck)	40	42	13	1	0	12
Automotive (Volkswagen, Toyota, Ford)	19	46	39	6	4	4
Telecom (NTT, Nokia, Eriksson)	13	16	2	3	0	1
Oil & Gas (PetroChina, Exxon, Shell)	1	3	0	3	0	0



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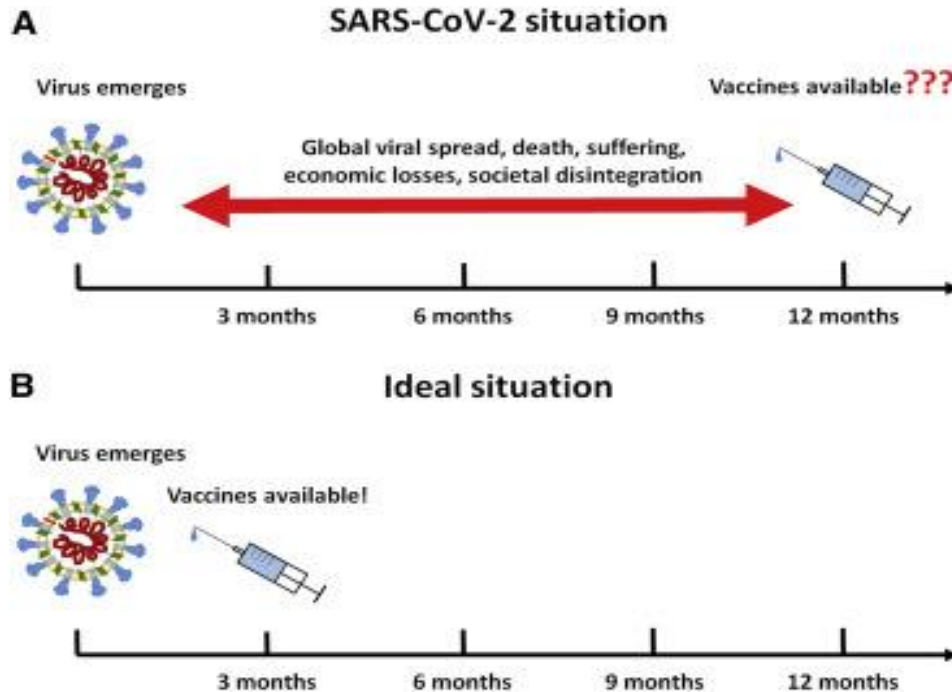


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Enhanced surveillance
Understanding pathogenicity

Select 50-100 vaccine strains
from different virus families

Produce GMP material
Stockpile vaccine
Occasionally update strains

Correlates of protection from
related human viruses

Perform Phase I/II trials with
long-term follow up



New virus emerges

Pick closest candidate, perform strain
change and start GMP manufacturing
campaign

Start Phase III trials
In parallel mass produce vaccines and
activate distribution network

Vaccine licensure based on Phase III
data and correlates of protection

days

3 weeks

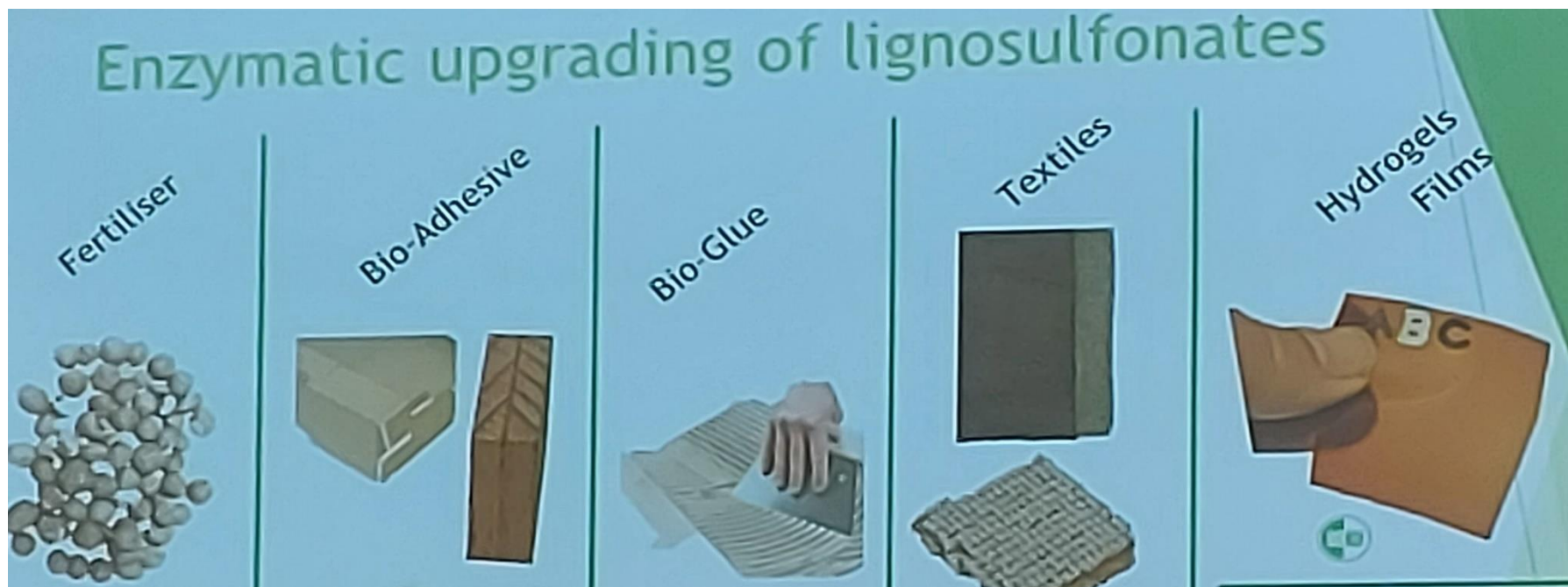
2 months

Krammer F. Pandemic Vaccines: How Are We Going to Be Better Prepared Next Time? Med (N Y). 2020 Dec 18;1(1):28-32. doi: 10.1016/j.medj.2020.11.004. Epub 2020 Dec 5. PMID: 33521752; PMCID: PMC7836605.



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Thank you for the attention!



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