
Bio-Modeling Systems

The Mechanisms-Based Medicine Company



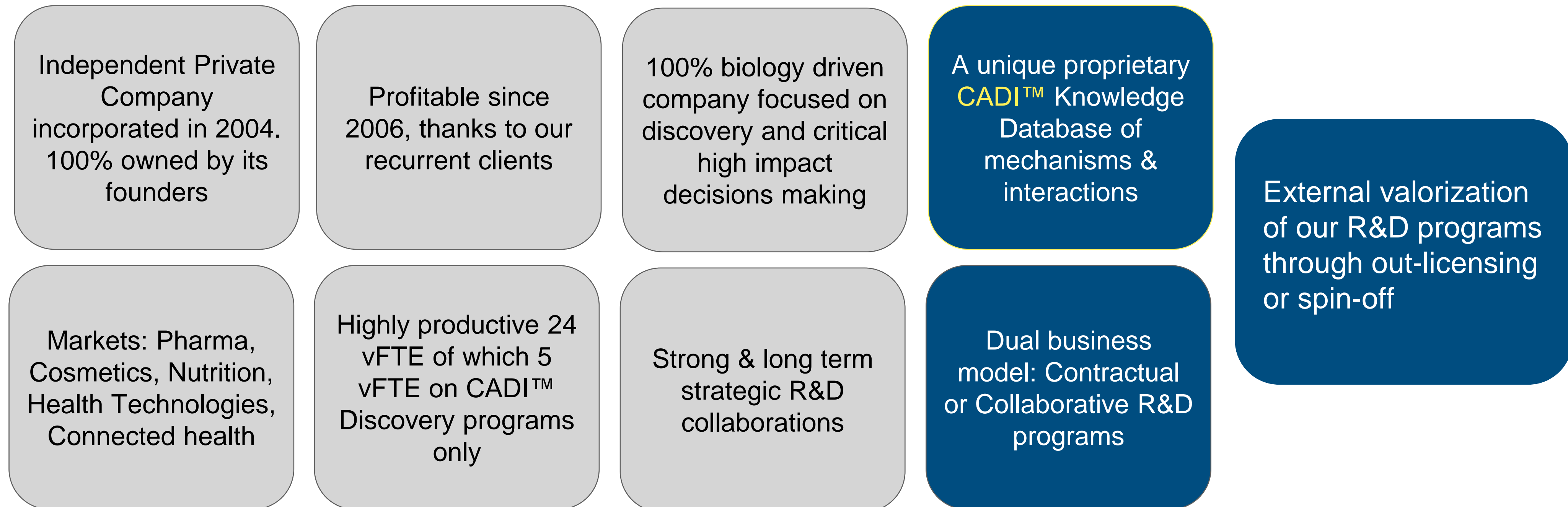
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Corporate Presentation

www.bmsystems.org

■ BMSystems at a glance



■ BMSystems' Dual Business Propositions

BMSystems addresses two complementary Businesses in Pharma, Biotech, Cosmetics, Nutrition, Bio-Processes and Digital-Health businesses

For R&D, Translational Medicine, & Digital Health Executives, we offer **robust alternative decision-making** to de-risk, save time and costs of R&D and Digital Health programs. *"In other words, we kill hypotheses and programs one phase before".*

For Business Developers, Patients Groups & Investors, we discover **novel low-risk, highly effective and cost-effective** diagnostic, therapy, nutrition, cosmetic, bioprocess solutions for spin-offs or out-licensing. *"In other words, we are a highly productive out-licensing and spin-off factory"*

■ BMSystems' Collaborative R&D valorization strategies

World's first discovery



World's first in vivo validation of Creutzfeldt-Jakob's disease mechanisms

BMSystems/CEA collaborative research in neurodegenerative diseases was awarded for the first in vivo validation of the mechanisms of Creutzfeldt-Jakob disease pathogenesis & progression (Bio IT World Best Practice Award 2009 and European Commission 2010).

Therapeutic Spin-off



Pherecydes-Pharma, BMSystems' first therapeutic spin-off.

Novel anti-bacterial, nano-agents biotherapies technology using phages. Pherecydes Pharma develops innovative and adaptive solutions to fight multi-resistant bacterial infections. Phase 2, Compassionate, use success. Listed Alternext Growth

Therapeutic Spin-off



Telesphore-Pharma, BMSystems' 2nd therapeutic spin-off project.

Therapeutic Solutions for Chronic Low Grade Inflammatory Disorders (CLGID). First-In-Class diagnostic & treatment for ME/CFS-ID & Post Covid-19 CLGID Subgroups. Ready for setup

Therapeutic Out-license



CEA/BMSystems exclusive license to Theranexus, a CEA's spin-off. Our collaborative research in psychiatric and neurological disorders, led to the co-owned worldwide patent WO20102913 exclusively licensed to Theranexus for the treatment of CNS disorders, listed Alternext Growth. **Program cancelled despite positive Phase II clinical trial**

■ BMSystems' collaborative network.



Our CADI™ discovery models were the laureates of two awards:
Bio IT World Best Practice Award 2009 &
European Commission 2010 as “State-of-the-Art Systems Biology
applications in Medicine”.



Etiology & Epigenetic and therapeutic evaluation for metabolic disorders program self funded. [UMANG program](#) R&D Collaboration with the Center of Excellence in Epigenetics IISER Pune India, Arbuza Regenerate and the HCL foundation addressing a 150 million children life threat nutritional problem.



Microbiota & Autism therapeutic H2020 program started with 14 M€ funding (2019).

We built the integrated CADI Autism model. (3 publications pending)
It gathers an international consortium of scientists to study the role of the gut microbiome in the development of Autism Spectrum Disorders (ASD).



Universiteit Utrecht



■ BMSystems' core multidisciplinary team



François Iris
Chief Scientific Officer

Chairman, CSO & CTO of BMSystems. 40 years of experience in life sciences. Christchurch School of Medicine (NZ), **Millennium Pharmaceuticals'** (USA) collaborator of **Nobel Laureate Jean Dausset**. **Inventor of CADI™** and of new technologies in molecular biology.



Manuel Gea
Chief Executive Officer

Vice-President & CEO of BMSystems. 30 years of experience in IT and life sciences management: **Colgate-Palmolive** **McKinsey**, **Boehringer** **Ingelheim**, **HemispherX** **Biopharma** (ME/CFS), **Pherecydes-Pharma** and other.



Dr. Gérard Dine
Chief Medical Officer

CMO BMSystems. 35 years of experience in clinical and medical research. Former **Head of hospital's Hematology** Dept. Former President of the **Institute for Sports Medicine**; IRMES - Institute for Research in bio Medecine and Epidemiology of Sport. **ME/CFS medical experience.**



Thanos Beopoulos
Integrative Biology director

Integrative Biology director of BMSystems. 15 years of experience in metabolic engineering at **CNRS, INRA & MIT**. Predictive biological models developer for immune, inflammatory, neurological, metabolic and cancer-related pathologies.

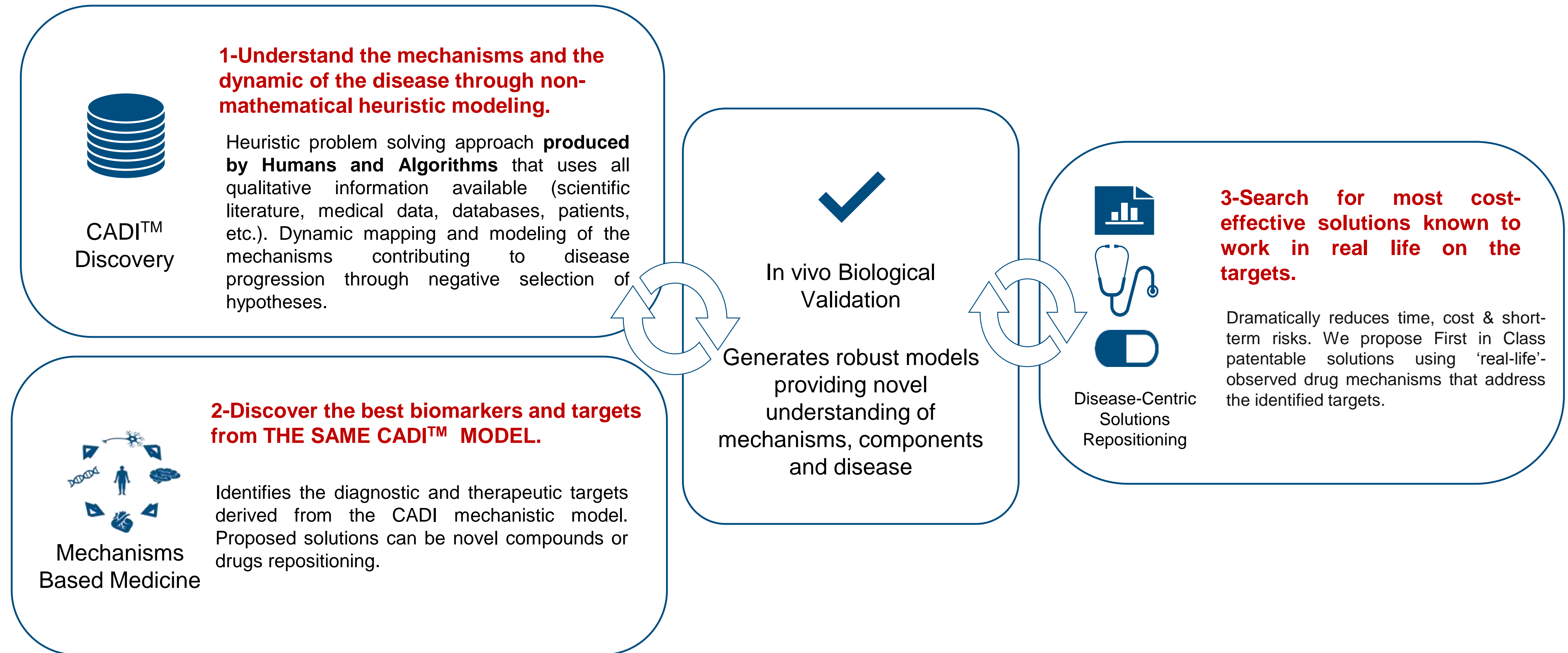


IPablo Santamaria,
IT & Internet Systems Director

30 years of experience in Internet technologies **and life sciences**. Scientific Engineering Degree from Ecole Centrale Paris, Founder and President of the computing firm Formitel, **Glaxo Pharma** (Evreux, France)

■ At BMSystems, we generate robust understanding of diseases

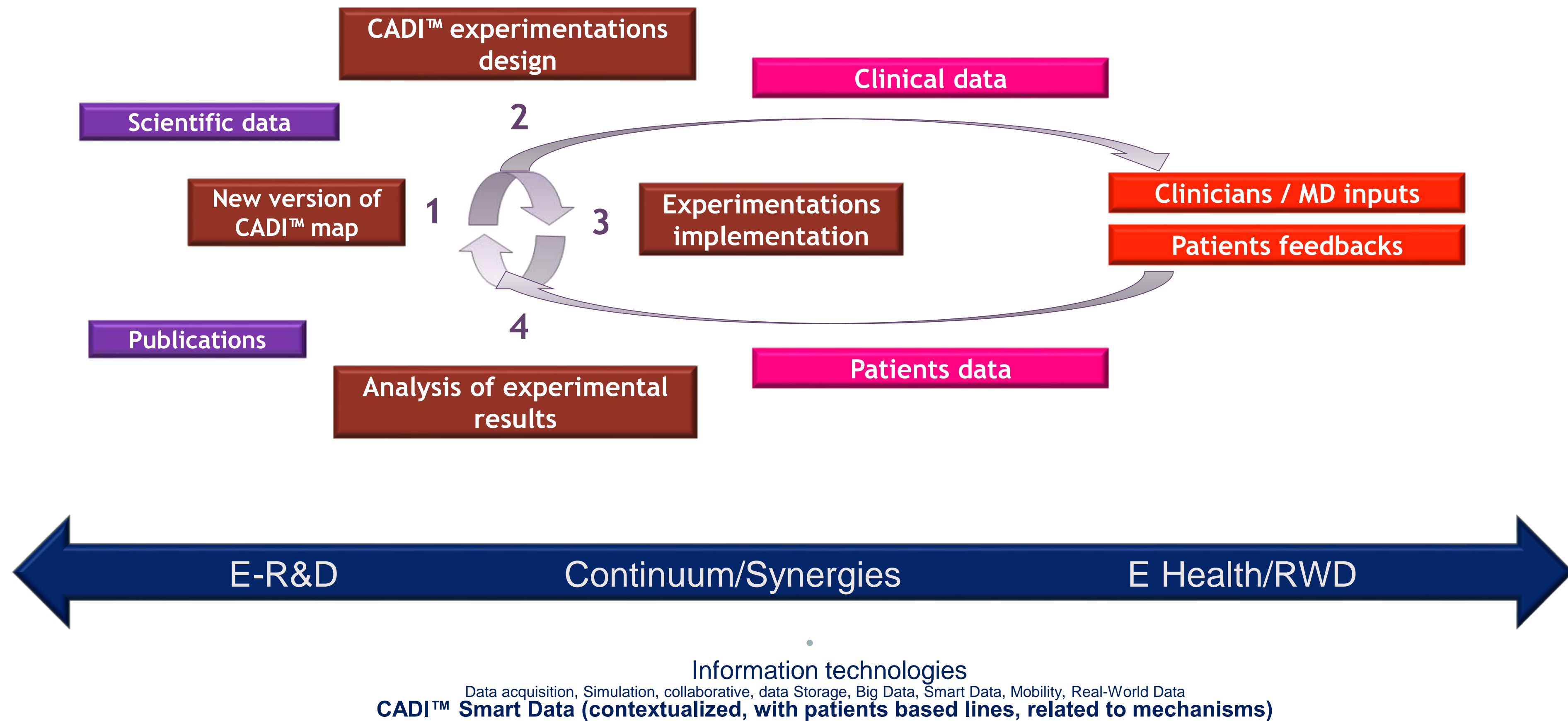
THE DEEP BMSYSTEMS' COMPETITIVE ADVANTAGE: BOTH TARGETS AND BIOMARKERS ARE THE OUTPUTS OF THE SAME CADI™ DISEASE MODEL THAT DESCRIBES THE DYNAMIC OF THE MECHANISMS OF THE DISEASE. AS A CONSEQUENCE, A POSITIVE DIAGNOSTIC TEST LEADS THE THERAPY SUCCESS.



■ CADI™ Discovery Global validation Principle

(Exploiting Smart Data (contextualized, with patients based lines, related to mechanisms data))

CADI™ Discovery from bench to bed to real patient health processes



■ BMSystems' R&D programs pipeline.

External valorization of our collaborative R&D programs through out-licensing or spin-off

Program Name	CADI™ Code	Business Partners	CADI™ - v.0	Validation/ PoC	Patent/ Publication	Mid scale/ Preclinical PoC
Nano-Bioagents-Bacteriophages	CADI-R101	Pherecydes	Produced	Yes	Yes	Validated
TAPE (protein improvement)	CADI-R102	Open	Produced	Yes	Yes	Validated
Chronic Fatigue Syndrome/ ME/ Gulf War Syndrome	CADI-R103	Yes/ Open	Produced	Yes	Pending	Validated
Core symptoms of Autism mechanisms	CADI-R201	Confidential	Produced	Yes		Launched
Microbiota & Autism- GEMMA	CADI-R202	H2020	Ongoing			
Creutzfeldt-Jakob disease's mechanisms	CADI-R301	CEA	Produced	Yes	Publication	Validated
Chronic anxiety mechanisms	CADI-R302	Max Plank	Produced	Yes	Publication	
Psychiatric Disorders therapeutic strategy	CADI-R303	Confidential	Produced	Yes	Patent	Validated
Psychiatric inflammatory mechanisms	CADI-R304	Fond. Fnd	Produced			
Alzheimer's Disease Causal Mechanisms	CADI-R305	Open	Produced			
Parkinson's Disease Therapy	CADI-R306	Open	Produced			
Fibromyalgia	CADI-R307	Open	Produced			
Pain (Central/Peripheral)	CADI-R308	Open	Produced			
Malnutrition & Metabolic Disorders	CADI-R402	IISER Pune	Produced	Yes	Pending	
Hypercholesteremia	CADI-R403	Open	Produced			
Metabolic Syndrome	CADI-R404	Open	Produced			

■ Therapeutic, Diagnostic, BioProcesses pipeline.

Program Name	Indication	Pre-clinic	Phase I	Phase 2a	Phase 2b	Comp. Use
COMBO-THERAPIES						
CADI-T1011	Multi-resistance infectious diseases	Ready	Ready			Started
CADI-T1031	CFS/ME low-grade chronic inflammation					
CADI-T1032	Gulf War Syndrome					
CADI-T2011	Attenuation of the Core Symptoms of Autism		Ready			
CADI-T3021	Parkinson's Disease		Ready			
CADI-T4021	Attenuation of Developmental Consequences of Children Malnutrition		Ready			
CADI-T4031	Metabolic Syndrome		Ready			
Internal Program Name	Indication	Pre-clinic	Clinic			
COMBO-DIAGNOSTICS						
CADI-D3041	Alzheimer's Disease Early Diagnostics		Ready			
Internal Program Name	Program Domains	Partners	CADI™ vers. 0	Ind. Valid.	Conf/Patent/ Pub.	First Proof of Concept (POC)
CADI™-BIOPRODUCTION						
CADI-B8011	Program Synthons (16 molecules study)	ARD-IBT-L'Oréal-Arkema-Solvay	Ready			Completed
CADI-B8021	Full Human Protein Glycosylation in yeast	Open				

■ Research areas of interest - CADI™ feasibility validated

Program Name	CADI™ Code	Business Partners
Autoimmunity: Global Concept	CADI-R106	Open
Microbiota, Inflammation & Metabolism	CADI-R203	Open
Migraine Mechanisms	CADI-R310	Open
Multiple Sclerosis Mechanisms	CADI-R311	Open
Hypercholesterolemia Mechanisms	CADI-R404	Open
Metabolic Disorders	CADI-R406	Open
Tumor Encysting Therapy	CADI-R504	Open
Adipocytes growth control	CADI-R602	Open
Modulation of skin hydration	CADI-R705	Open
Lipid constituents of the skin barrier	CADI-R706	Open
Hair Loss Mechanisms	CADI-R707	Open

■ BMSystems' CADI™ publications to date

CADI™ Models published in prestigious peer-reviewed journals: (click on the blue links to get the pdf)

- [2023: Frontiers in Neuroscience](#): H2020-GEMMA: Autism (ASD): “RNA epitranscriptomics dysregulation: A major determinant for significantly increased risk of ASD pathogenesis”.
- [2022: Frontiers in Neuroscience](#): H2020-GEMMA: Autism (ASD): "Autism Spectrum Disorders pathogenesis: Toward a comprehensive model based on neuroanatomic and neurodevelopment considerations".
- [2022: Nutrients Journal \(MDPI\)](#): H2020-GEMMA: Autism (ASD): “Autonomic Nervous System Neuroanatomical Alterations Could Provoke and Maintain Gastrointestinal Dysbiosis in Autism Spectrum Disorder (ASD): A Novel Microbiome–Host Interaction Mechanistic Hypothesis”. Special Issue Microbiome, Probiotics and Autism.
- [2021: Journal of Nutritional Science](#): Maternal malnutrition and anaemia in India: dysregulations leading to the ‘thin-fat’ phenotype in newborns, Sanjeev Galand, ISEER Shiv University, François Iris BMSystems, Prachi Pandit Arbuza Regenerate
- [2018: Current Opinion in Pharmacology](#): How scientific literature analysis yields innovative therapeutic hypothesis through integrative iterations. CADI Discovery addresses the complexity of life sciences mechanisms and the digital « garbage in garbage out » reality
- [2014: CNS Psychiatry publication](#): American Journal of Psychiatry and Neuroscience. Second publications with the Max Planck Institute of Psychiatry in Munich: Differential proteomics analyses reveal anxiety-associated molecular and cellular mechanisms in cingulate cortex synapses. The first output of the DECIUS CNS research program.
- [2012, CNS neurodegenerative & psychiatry](#): PharmacoPsychiatry publishes the first review describing a productive vision of Systems Medicine that will change R&D organization and interactions between clinicians & researchers & reveals how the world's first explanation of the mechanisms of the Creutzfeldt-Jakob disease led to the discovery of a truly innovative psychiatric treatment.
- [2011, CNS Psychiatry](#): Pharmaco Psychiatry publication: Proteome-Based Pathway Modelling of Psychiatric Disorders. Publication with The max Planck Institute of Psychiatry in Munich
- [2010, Infectious diseases](#): Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science :Genetically Engineered Virulent Phage Banks in the Detection and Control of Emergent Pathogenic Bacteria. Publication with Pherecydes-Pharma.
- [2009, Tissue differentiation](#): Médecine & Sciences: Müllerian duct regression explanation. Integrative systems biology & experimental Biology. Publication with CNRS experimental data.
- [2005, Cancer](#): Journal of molecular Endocrinology: Integrative analysis of gene expression patterns predicts specific modulations of defined cell functions by estrogen and Tamoxifen in MCF7 breast cancer cells. Publication in collaboration with INSERM unit 553.
- [2003, Cancer](#): Nucleic Acids Research: Integrated transcriptome analysis of the cellular mechanisms associated with H-ras-dependent malignant transformation of the human breast epithelial MCF7 cell line. Publication in collaboration with INSERM unit 553. World first. First in-silico model of a complex human disease validated in-vitro and published.

Collaboration to scientific reference books:

- [2014: Dermatology Cosmetics](#). The first reference book on “Computational Biophysics of the Skin” edited by Prof. Bernard Querleux , scientific chairperson of the International Society for Biophysics and Imaging of the Skin
- [2011: Phage Nano Technology](#) book published by Valery Petrenko. Chapter 8: Genetically Engineered Virulent Phage Banks for the Detection and Control of Bacterial Biosecurity Threats.
- [2008: CNS](#): Biomarkers for Psychiatric Disorders. (Ref. ISBN: 978-0-387-79250-7, November 2008). Dr. François Iris, is the author of the Integrative Biology chapter of the book. The editor, Prof. Christoph W. Turck, is head of the Proteomics and Biomarkers branch at the Max Planck Institute for Psychiatry

Thank You.

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