

Bio-Modeling Systems

The Mechanisms-Based Medicine Company



CADI™ Discovery programs

for Therapeutics, Diagnostics, Nutrition, Cosmetics and BioProduction

Short corporate Presentation

This is not a pitch presentation

This document is for download only

We added the necessary details and explanations in the slides to help the reader

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BMSystems' R&D programs pipeline

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

| Program Domains | Partners | CADI™ compliance | CADI™ vers. 0 | Ind. Valid. | Secret or Patent or Co-Patent/Publi. | First Proof of Concept (POC) | Mid scale or preclinic. P.O.C. |
|-----------------|----------|------------------|---------------|-------------|--------------------------------------|------------------------------|--------------------------------|
|-----------------|----------|------------------|---------------|-------------|--------------------------------------|------------------------------|--------------------------------|

Infection-Immunology

Microbiotas/Microbiome (skin, lung, gut, etc.)

Neurology/Psychiatry (CNS-PNS)

Metabolism

Cardiovascular Diseases

Oncology

Dermatology/Cosmetics

BioProcesses

| | | |
|----------------------------------|-------------------------|-------------------------|
| Infection-Immunology | Oncology/Inflammation | Dermatology/Cosmetics |
| CNS-PNS/Inflammation | Tissue Differentiation | Cardiovascular Diseases |
| Industrial biotech/ bioprocesses | Metabolism/Inflammation | Microbiotas |

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|---|-----------------|----------------------------------|------------------|---------------|---------------|--------------------------------------|------------------------------|--------------------------------|
| Nano-Bioagents-Bacteriophages | CADI-R101 | Pherecydes | | | | | | Validated |
| TAPE (protein improvement) | CADI-R102 | Open | | | | | | Validated |
| Chronic Fatigue Syndrome / Gulf War Syndrome | CADI-R103 | CFS Asso / Open | | | Started | | | |
| Ebola virus ecology | CADI-R104 | Open | | | | | | |
| Hepatitis C | CADI-R105 | Open | | | | | | |
| Autoimmunity : Global concept | CADI-R106 | Open | high Interest | | | | | |
| Core symptoms of Autism mechanisms | CADI-R201 | Confidential | | | Produced | | | |
| Microbiota & Autism H2020 program 14 M€ funded | CADI-R201 | H2020 | | | Started | | | |
| Microbiota ecology, physiology & metabolic mechanisms | CADI-R202 | Open | high Interest | | | | | |
| Microbiota & inflammation | CADI-R203 | Open | high Interest | | | | | |
| Creutzfeldt-Jakob disease's mechanisms | CADI-R301 | CEA Life Sciences | | | | | | Validated |
| Cellular & metabolic mechanisms associated with chronic anxiety | CADI-R302 | Max Planck Munich | | | | | Validated | |
| Psychiatric Disorders therapeutic strategy | CADI-R303 | Confidential | | | | | Ready | |
| Alzheimer's Disease Causal Mechanisms | CADI-R304 | Open | | | Produced | | | |
| Parkinson's Disease Therapy | CADI-R305 | Confidential | | | Produced | | | |
| Psychiatric inflammatory mechanisms | CADI-R306 | FondaMental Foundation | | | Produced | | | |
| Fibromyalgia, facial pain | CADI-R307 | Open | | | Produced | | | |
| Pain (Central/Peripheral) | CADI-R308 | Open | | | Produced | | | |
| Migraine Mechanisms | CADI-R310 | Open | high Interest | | | | | |
| Multiple Sclerosis Mechanisms | CADI-R311 | Open | high Interest | | | | | |
| Etiology & Epigenetics in Diabetes type 2 | CADI-R402 | IISER Pune | | | Produced | | | |
| Metabolic Syndrome | CADI-R403 | Confidential | | | Produced | | | |
| Hypercholesterolemia Mechanisms | CADI-R404 | Open | | | | | | |
| New global concept for Diabetes type 1 | CADI-R405 | Open | | | | | | |
| Metabolic Disorders | CADI-R406 | Open | high Interest | | | | | |
| Atherosclerosis mechanisms | CADI-R901 | Open | | | Produced | | | |
| Breast cancer-Hras | CADI-R601 | INSERM | | | | | Validated | Validated |
| Tamoxifen resistance | CADI-R502 | INSERM | | | | | Validated | |
| Specific Metastasis control | CADI-R503 | INSERM | | | Validated | | | |
| Tumor Encysting Therapy | CADI-R504 | Open | high Interest | | | | | |
| Müllerian regression Mechanisms | CADI-R601 | CNRS | | | | | Validated | |
| Adipocytes growth control | CADI-R602 | Open | | | | | | |
| Skin pigmentation Mechanisms | CADI-R701 | Open | | | Validated | | | |
| Skin pigmentation Modulation | CADI-R702 | Open | | | Validated | | | |
| Skin Contact Allergy Mechanisms | CADI-R703 | Open | | | Produced | | | |
| Skin aging Mechanisms | CADI-R704 | Open | high Interest | | | | | |
| Modulation of skin hydratation | CADI-R705 | Open | high Interest | | | | | |
| Modulation of the lipid constituents of the skin barrier | CADI-R706 | Open | high Interest | | | | | |
| Novel Hair Loss Mechanisms | CADI-R707 | Open | high Interest | | | | | |
| Program Synthons | CADI-R801 | ARD-IBT-L'Oréal | | | | | | Validated |
| Full Human Protein Glycosylation in yeast | CADI-R802 | Open | | | high Interest | | | |

BMSystems' Therapeutics-Diagnostics-BioProduction CADI™ pipeline*

| Internal Program Name | Indication | Pre-clinic | Phase I | Phase 2a | Phase 2b | Comp. Use | Phase 3 |
|-----------------------|------------|------------|---------|----------|----------|-----------|---------|
|-----------------------|------------|------------|---------|----------|----------|-----------|---------|

COMBO-THERAPIES

| | | | | | | | |
|------------|--|-------|-------|--|--|--|---------|
| CADI-T1011 | Multi-resistance infectious diseases | | | | | | Started |
| CADI-T1031 | CFS/ME low-grade chronic inflammation | | Ready | | | | |
| CADI-T1032 | Gulf War Syndrome | Ready | | | | | |
| 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 |
|------------|---------------------------------------|--|-------|

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CADI™-BIOPRODUCTION

| | | | | | | |
|------------|---|-------------------------------|--|-------|--|-----------|
| CADI-B8011 | Program Synthons (16 molecules study) | ARD-IBT-L'Oréal-Arkema-Solvay | | | | Completed |
| CADI-B8021 | Full Human Protein Glycosylation in yeast | Open | | Ready | | |

* New internal classification

BMSystems' outstanding POCs and our 2 first external outputs



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



Pherecydes-Pharma (2006): First BMSystems' therapeutic spin-off, (novel M.R. anti-bacterial nano-agents biotherapies with phages), indications: Multi-resistant infections compassionate use success.



CEA/BMSystems collaborative research in CNS (psychiatric and neurological disorders) led to the co-owned patent WO201029131 with a worldwide exclusive license to a CEA's spin-off .

5 ongoing BMSystems' outstanding R&D programs



Microbiota & Autism therapeutic H2020 program started with 14 M€ funding. GEMMA program (Genome, Environment, Microbiome and Metabolome in Autism) gathers an international consortium of scientists to study the role of the gut microbiome in the development of Autism Spectrum Disorders (ASD).



Etiology & Epigenetic and therapeutic evaluation for metabolic disorders program self funded. UMANG program (Now implemented by Arbuza Regenerate Pvt Ltd) How does maternal nutrient restriction coupled with defective one-carbon metabolism alter the foetal development program, leading to enhanced predisposition to T2D in adolescence? Center of Excellence in Epigenetics IISER Pune India



Diagnostic & Therapeutic evaluation program self funded. The French Chronic Fatigue Syndrome Association decides to clinically evaluate the ME/CFS pathogenesis model produced by Bio-Modeling. This therapy will also be applied to Gul war Syndrome



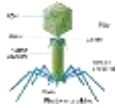
Therapeutic evaluation program self funded. Parkinson's disease and metabolic syndrome. The program led to a combinatorial therapeutic approach utilizing two molecules that had long been on the market, neither of which has any known toxicity or undesirable effects. Evaluation status: Discussion with confidential partners



Causal metabolic mechanisms of Alzheimer Disease (AD) model was produced by Bio-Modeling System in 2017-2018. The model in its current state is able to produce biomarkers that could probably predict or increase alertness for identifying AD at its very early stages of progression. Discover the 14 key components explained

BMSystems' CADI™ Bio-Production programs

For more information about CADI Bio-Production programs



Pherecydes-Pharma (2006): First BMSystems' therapeutic spin-off, (novel M.R. anti-bacterial nano-agents biotherapies with phages), indications: Multi-resistant infections compassionate use success.

3 patented new disruptive technologies invented (TAPE Patent: WO/2008/093010, AB-ACCUS patent: WO/2008/093009 - December 2006. RIPH patent: WO/2010/125296 , 3 publications.



Synthons Program: Feasibility study Industrial biotech program for 16 chemical molecules:

Synthons major collaborative industrial biotech research platform funded by the ministry of Industry in the IAR world-class cluster in France. Search for innovative processes non existing patent-dependent

OUTPUTS: A unique significant bacteria metabolic pathways database of strong interest.

- 16 CADI BioProduction models produced
- 2 engineered bacterial strains generated are under evaluation and
- a finalized process under mid-scale validation (patent pending).

The program was funded by the ministry of Industry and supported by IAR world-class cluster



Full Human Protein Glycosylation in Yeast. The challenge: How to find a way to efficiently overcome the major limitations to the large-scale production of humanized glycoproteins in yeast cells?

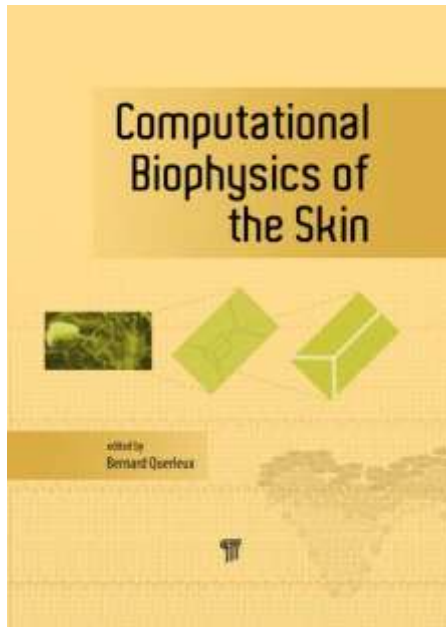
We developed a CADI™ Glycosylation Model that describes the means whereby “human-type, glycosylation pattern-specific tool-boxes” can be constructed and stably harnessed in yeast cells.

To succeed BioProduction programs, the industry need strong collaboration between a correct understanding of the complex mechanisms of strains and a State of the Art engineering, evaluation, and production processes expertises.

BMSystems' applications focus in dermatology and cosmetics

1. Skincare: Strong integrated understanding of the global systems:
 1. *The mechanisms associated with constitutive and facultative epidermal pigmentation*
 2. *The mechanisms associated with senile/solar lentigines (aging issues)*
 3. *Components specific to pigmentation from production to destruction*

Contributor to 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. R&I L'Oréal.



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| Skin Contact Allergy Mechanisms | Open | | high Interest |
| Skin pigmentation Mechanisms | Open | | high Interest |
| Skin pigmentation Modulation | Open | high Interest | |
| Skin aging Mechanisms | Open | high Interest | |
| Modulation of skin hydration | Open | high Interest | |
| Modulation of the lipid constituents of the skin barrier | Open | high Interest | |
| Novel Hair Loss Mechanisms | Open | high Interest | |

Mechanisms-Based Medicine applied to cosmetics and dermatology
 A new paradigm qualified for novel solutions in premium personalized marketing strategies

BMSystems Group at a glance

Bio-Modeling Systems is the world's first Mechanisms-Based Medicine company that successfully changed the discovery paradigm, addressing the complexity of life sciences mechanisms and the digital "garbage in garbage out" reality through CADI™ Discovery based on Augmented Intelligence, the other complementary AI, for complex systems.*

- BMSystems Group addresses two complementary targets in Pharma, Biotech, Cosmetics, Nutrition, Bio-Production and Digital-Health businesses:
 1. **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,
 2. **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.
- Created in 2004, profitable since 2006, thanks to our recurrent clients, CADI™ Discovery already delivered numerous operational outputs and novel businesses. (See details in next slides).

BMSystems Group description

- *Independent Private Company incorporated in 2004. 100% owned by its founders.*
- *Profitable since 2006, thanks to our recurrent clients.*
- *100% biology driven company focused on discovery, and critical high impact decisions making*
- *A unique proprietary CADI™ Knowledge Database of mechanisms & interactions.*
- Markets: Pharma, Cosmetics, Nutrition, Health Technologies, Connected health,
- Highly productive 24 vFTE* of which 9 vFTE on CADI™ Discovery programs only.
- *Strong & long term strategic R&D collaborations (>100 people collaborating).*
- Dual business model : Contractual or Collaborative R&D programs.
- *BMSystems values its therapeutics programs through out-licensing or spin-off.*
- Outstanding internal pipeline of programs ready for collaborations.

- *Our Potential competitors: Key Opinion Leaders, dominant thinking companies or pharma Systems Biology or bioinformatics teams argue they can do the same. We are always open for discussions & comparisons on success rates and outputs for patients.*

The World's first Mechanisms-Based Medicine Company
You have a R&D issue or a decision to make, we may have a solution for you.