Myalgic Encephalomyelitis /Chronic Fatigue Syndrome

Therapeutic model walkthrough

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Webinar

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What this presentation is about.

At BMSystems, thanks to our long experience in inflammatory diseases and our close collaboration with the French ME/CFS patients association (ASFC), we have been able to decipher and model the pathological mechanisms driving ME/CFS.

Today, we are ready to propose a robust solution for the diagnosis and treatment of this low-grade inflammatory immune disorder and its debilitating symptoms.

As one of the most common triggers of ME/CFS are acute ssRNA viral infections, an imminent increase in its prevalence is expected due to the current coronavirus pandemic. We're convinced that the Covid-19 crisis is the unique opportunity to help people suffering from ME/CFS, raise awareness of the systemic nature of the disease and prevent as many "Post Covid-19" patients as possible from the therapeutic wandering they are already experiencing due to the lack of comprehension of the disease's mechanisms and management.

This presentation is a walkthrough to the therapeutic model and its implementation. The next step will require bringing together all of our strengths and experience to help fight this disease.

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Agenda

- BMSystems at a glance
- ASFC collaboration objectives
- Overview of ME/CFS mechanisms
- COVID-19 epidemic: a risk factor for CFS/ME
- Diagnostics & Treatment
- Implementation Roadmap
- Q&A

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BMSystems at a glance.

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

Dual business model : Contractual or Collaborative R&D programs.

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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”.

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BM Systems

BMSystems’ outstanding operational PoC examples.

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).

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. Compassionate use success.

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.

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Therapeutic pipeline.

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

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				Completed
CADI-B8021	Full Human Protein Glycosylation in yeast	Open		Ready		

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ASFC collaboration objectives.

transform ME/CFS from a syndrome that lacks concrete diagnostic criteria and treatment, into a universally recognisable, diagnosable and treatable organic disease.

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HOW WE'LL GET THERE?

BMSystems has evaluated the resilience of its CADI™ ME/CFS Model and is ready to propose a robust solution for the diagnosis & treatment of the pathology.

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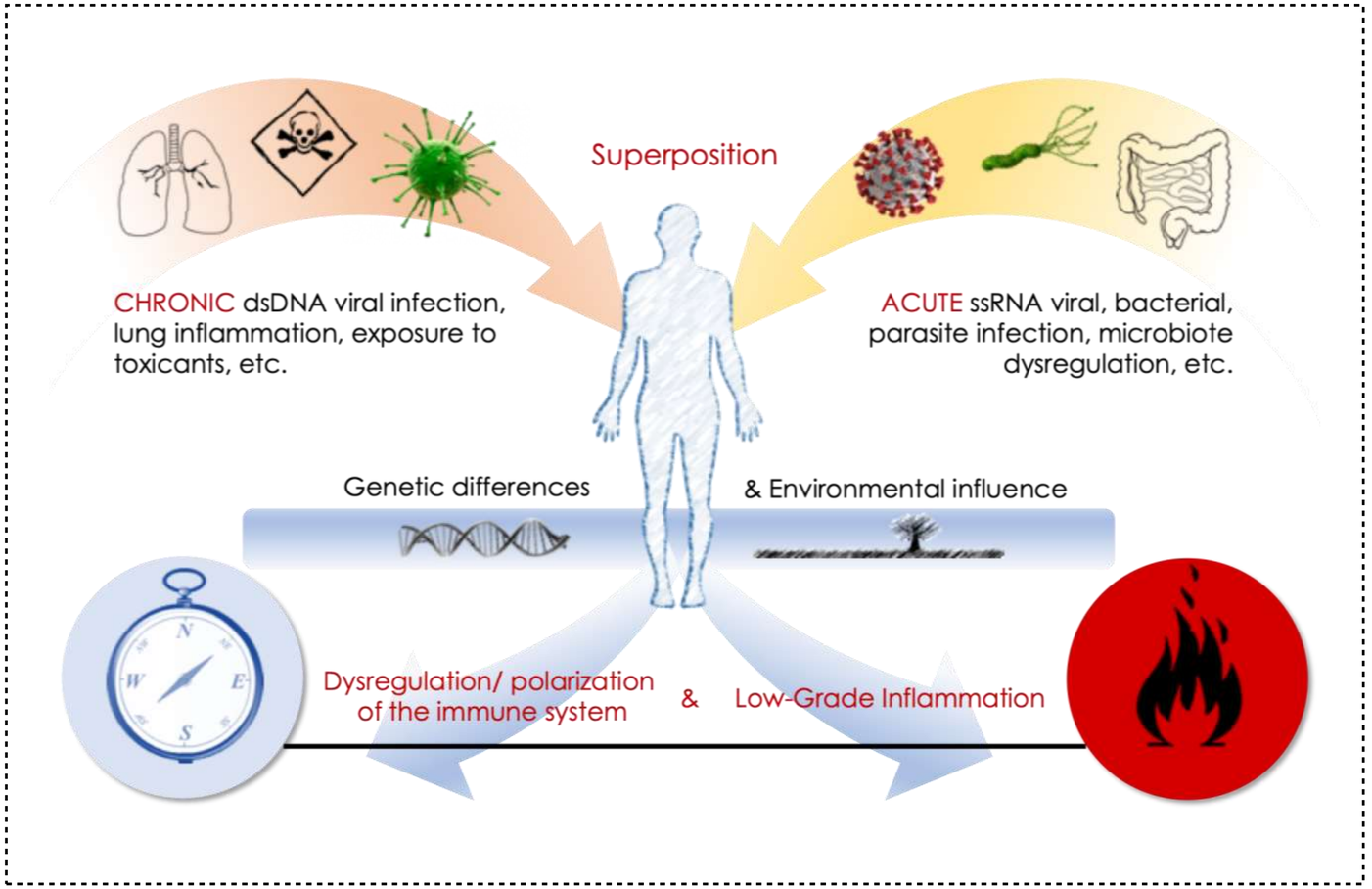
Overview of ME/CFS mechanisms.

ME/CFS is an immunological condition caused by the overlapping of conflicting immune strategies

In ME/CFS, the immune system tries to simultaneously resolve infection-like hazards that require opposing and often mutually cancelling strategies (known as humoral and cellular responses).

These are often triggered by acute ssRNA viral infections (like influenza or coronaviruses) on an inflammatory background caused by chronic dsDNA infections (like herpes, Epstein-bar and cytomegalovirus).



In ME/CFS, the immune system is ‘stuck’ in a constant, low potency, pro-inflammatory mode.

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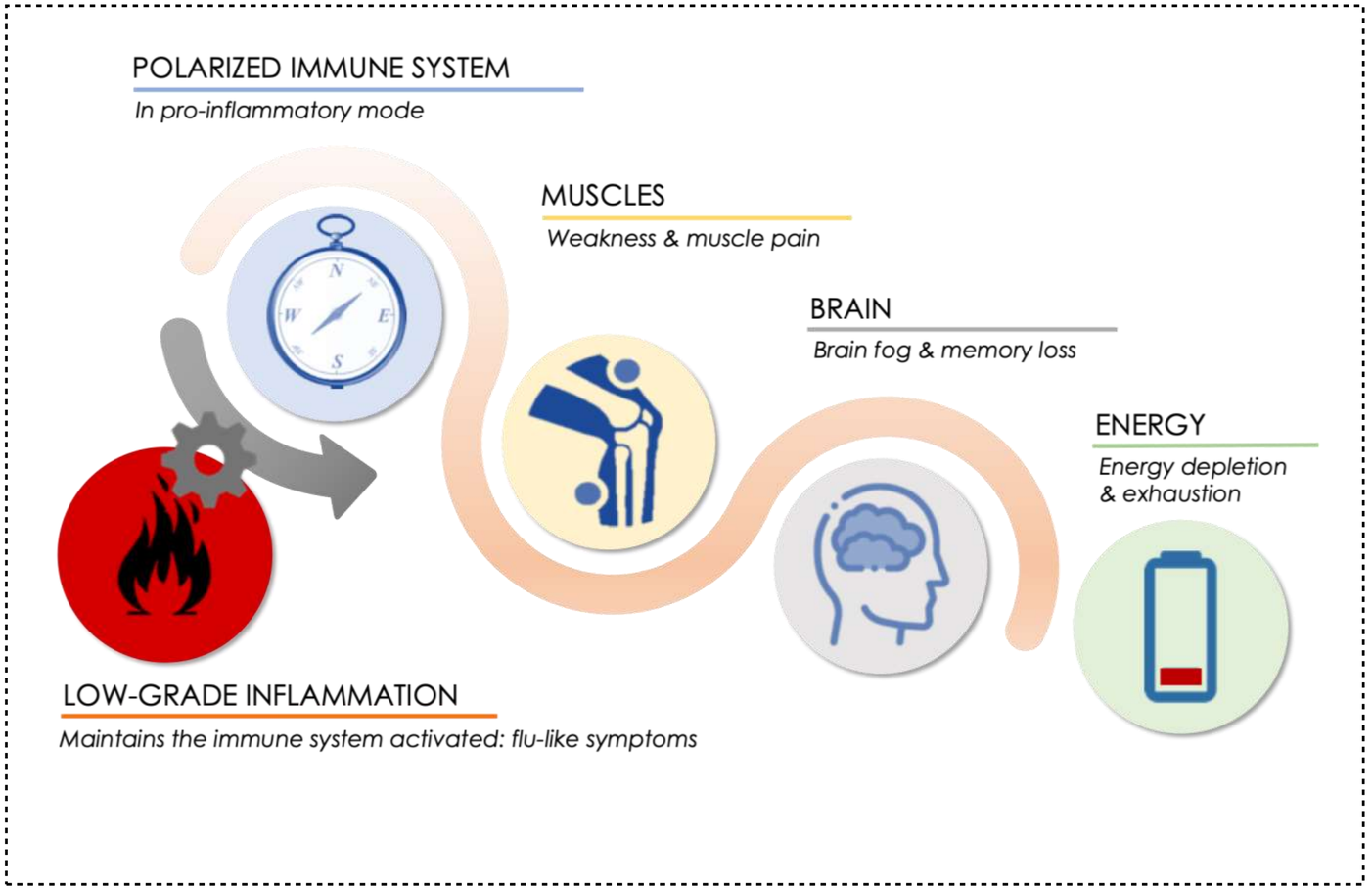
Overview of ME/CFS mechanisms.

ME/CFS causes systemic low-grade inflammation that exhausts the organism

The immune system, in addition to fighting infections, is responsible for the organism's housekeeping functions and in particular the constant monitoring and repair of tissues and organs.

In ME/CFS, this function is compromised because the immune system is 'stuck' in a constant, low grade pro-inflammatory mode. Instead of repairing, its intervention causes muscular weakness and pain, flu-like and cognitive symptoms, while it depletes the organisms' energy and sleep fails to be restorative.



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COVID-19 epidemic: a risk factor for ME/CFS.

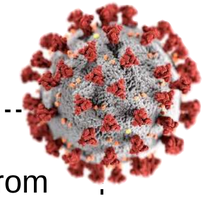
WHAT THE MODEL PREDICTS:

TRIGGER 1

The inflammatory background for ME/CFS can be set by chronic dsDNA viruses as Herpes, Epstein-Bar or Cytomegalovirus.

superposition

TRIGGER 2



ME/CFS can be then triggered by acute infections from ssRNA viruses like coronaviruses.

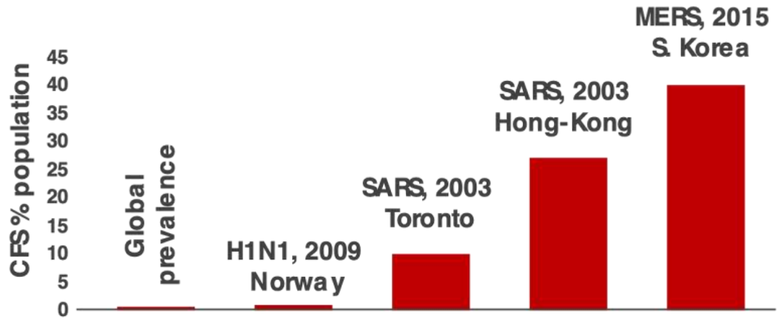
90% of the population is exposed to chronic dsDNA viruses. For some people these can set the inflammatory background for CFS/ME to occur depending on genetic and environment factors that shape an individual's immune system.

Influenza and coronaviruses are all positive sense single-stranded RNA viruses ssRNA viruses, and among them, Sars-Cov-1, Mers-Cov and Sars-Cov-2 are known to cause very acute infections and inflammatory syndromes.

WHAT WE'VE LEARNED FROM PREVIOUS ssRNA EPIDEMICS:

Worldwide ME/CFS prevalence : 0,5 %

CFS/ME occurrence after ssRNA virus epidemics:
2% following the 2009 influenza A (H1N1) pandemic in Norway,
27% of 2003 SARS epidemic survivors in Hong Kong,
10% of 2003 SARS epidemic survivors in Toronto,
40% of 2015 MERS survivors in South Korea



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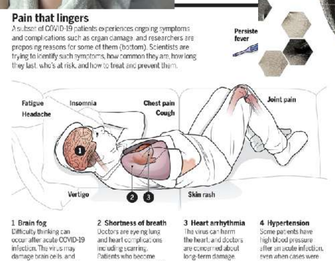
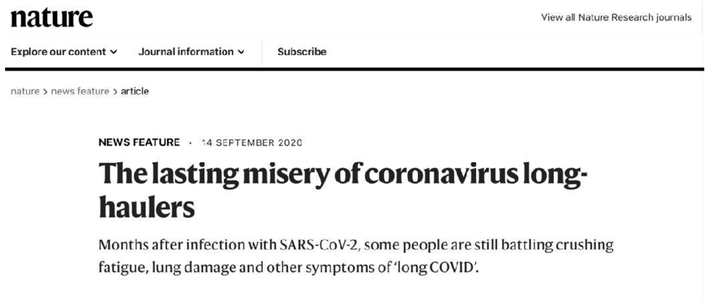
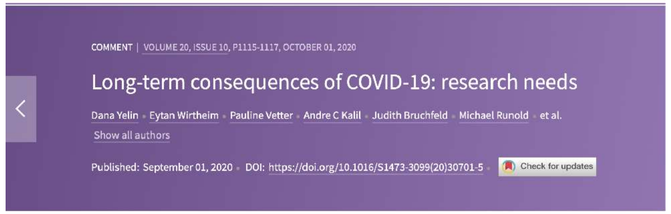
COVID-19 & CFS/ME: it's already happening.







> **"There are a considerable number of individuals who develop a post-viral syndrome. They report symptoms such as brain fog, difficulty concentrating and fatigue that resemble the symptoms of CFS/ME"**
>
> - *Anthony Fauci, Head of NIAID & White House Coronavirus Task Force*

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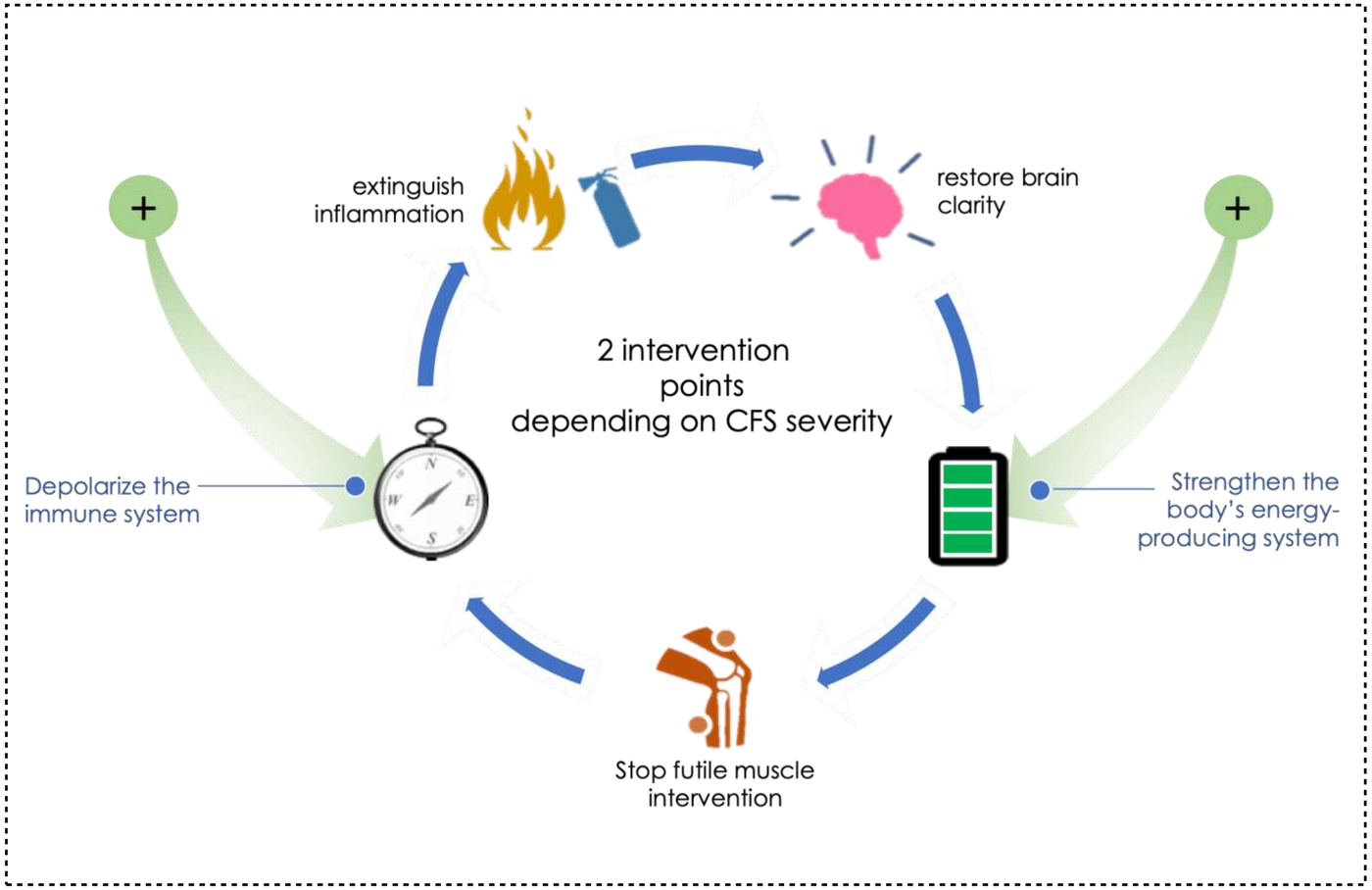
CFS/ME treatment.

A customisable treatment that addresses the causal mechanisms of the disease

Our treatment restores the balance of the immune system, halts systemic low-grade inflammation and re-establishes its role in monitoring and repairing the body, while at the same time re-enables the body's energy-producing machinery.

The treatment is customisable and address the causal mechanisms of the disease. Its components have no known toxicity nor side effects either individually or in combination.



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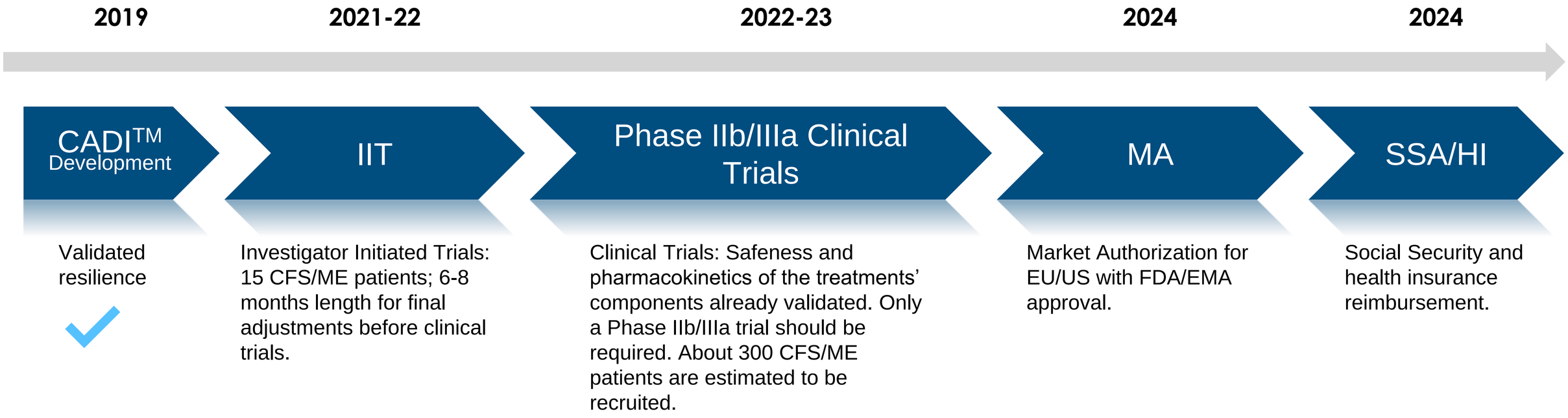
Implementation roadmap.



CFS/ME Pharmacological treatment is a "disease-centric repositioning" of existing molecules addressing the causal mechanisms of the pathology. They have no toxicity nor side effects either individually or in combination. Technology patent ready to be filed.

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Telesphore Pharma leading Team

An experienced and multidisciplinary leading team with a robust experience in ME/CFS

François Iris
Founder & Chief Scientific Officer

Geneticist, physiologist & molecular biologist. 40 years of experience in life sciences in academia and industry : Dept. of Medicine University of Otago, The Christchurch School of Medicine (NZ) Millennium Pharmaceuticals' (USA) collaborator of Nobel Laureate Prof. Jean Dausset. Inventor of CADI™ and of new technologies in molecular biology. MRC Overseas fellow, Member of H.U.G.O., Wellcome Trust, and other. Chairman, CSO & CTO of BMSystems.

Manuel Gea
Founder & Chief Executive Officer

Pharma operations: 30 years of experience in IT and life sciences. Scientific Engineering Degree from Ecole Centrale Paris. Various experiences R&D and business from consumer goods Industry to cosmetics, biotechnology & pharmaceutical companies: Colgate-Palmolive McKinsey, Boehringer Ingelheim, HemispherX Biopharma (ME/CFS, Pherecydes-Pharma, BMSystems, and other. Vice-President & CEO of BMSystems.

Thanos Beopoulos
Founder & Chief Development Officer

Biologist - Biochemist with a PhD in Biotechnology from INA-PG, France. 11 years of experience in metabolic engineering at CNRS, INRA & MIT. Predictive biological models developer for identifying therapeutic mechanisms for (auto) immune, inflammatory, neurological, metabolic and cancer-related pathologies. Integrative Biology director of BMSystems.

Dr. Gérard Dine
Founder & Chief Medical Officer

Physician, biologist. 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. Author: Biological monitoring of the athlete: Biological measurements, pathologies, biological passport of the athlete, genomics. CMO BMSystems. ME/CFS medical experience.

Isabelle Fornasieri
Founder & Member of the Scientific board

ME/CFS Expert: Senior Lecturer, University of Strasbourg, Faculty of Psychology. Member of the Scientific Council of the French Association for Chronic Fatigue (ME/CFS)
1991: Doctorate University of Strasbourg 1 University, Ethology Specialty. "Scent communications and social relations in two species of lemurs • DEA "Physiological and Behavioral Regulations"

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Q&A

Thank You.

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