Modulation of Human Physiology

The future of perpetual health lies in mastering and modulating Human Physiology

Deniplant Biomedical Center – Moving from reactive medicine to algorithmic, predictive and systemic medicine

Why is this perspective profound and correct?

The future of medicine is no longer just reactive, but becomes **algorithmic, predictive, and deeply personalized** through direct control over physiological mechanisms. We must quickly move from the phase in which we only treat the symptoms of diseases to the era in which we optimize the biological system to prevent its degradation.

Mastering and modulating human physiology is based on revolutionary technological and scientific pillars:

- **Epigenetics and cellular reprogramming:** We no longer dictate our future solely through the genes written in DNA. Modulating the way genes are expressed (through lifestyle, diet, or advanced therapies) allows us to "turn off" disease genes and "turn on" longevity genes.
- **Synthetic biology and gene editing (CRISPR):** We can correct coding errors directly at the source, eliminating genetic risks before they manifest physiologically.
- **Bioelectronics and nervous system interfaces:** Modulating vagus nerve activity or using fine electrical impulses or modulating the microbiome can control chronic inflammation, heart rate, and immune response without resorting to classical drugs.
- **AI-guided precision medicine:** Wearable sensors monitor biomarkers in real time (glucose, heart rate variability, oxygen levels), allowing for instant physiological adjustments.

Human physiology is, in essence, a complex system feedback networks. Those who learn to decode and modulate these signals hold the key to long-term health (or *"perpetual health"*).

Most incurable or difficult-to-treat diseases arise from the chain of disruption of interacting biological systems, and even less from specific defects. With the help of AI and today's technologies, we can revolutionize medicine and change the paradigm of curing diseases, by monitoring and modulating human biology at a systemic level.

Can current medicine still be revolutionized?

To revolutionize medicine and move from the current reactive model to a paradigm of systemic and predictive healing, we must transform the human body from a "black box" into a biological system that can be controlled in real time.

This radical change is based on three interconnected pillars:

1. Continuous digital and molecular monitoring (Window to the system)

Today, medicine only uses occasional "snapshots" of health (annual analyzes, biopsies). The revolution demands a **continuous video feed** of the entire physiology:

- **Implantable sensors and nanoscale biochips:** Continuously measure concentrations of glucose, cortisol, cytokines, neurotransmitters and metabolites.
- **Real-time liquid biopsy:** Instantly detect circulating tumor DNA (ctDNA), exosomes and tumor cells at the first signs of onset.
- **Integrated multi-omics at the single cell level:** Dynamically monitor the transcriptome, proteome and metabolome of a cell, capturing the transition from health to "pre-disease".

2. Digital Twins and AI: Decoding Biological Complexity

The human body is a complex adaptive system. The solution is **Digital Twins**:

- **High-fidelity computational models:** Virtual replica of the patient's biology, continuously fed with data.
- **Predictability through simulation:** AI simulates the impact of treatment on digital twins at the molecular network level, anticipating side effects.
- **Cellular state mapping:** Identify exactly when a cell becomes senescent ("zombie cell") or when a tissue becomes chronically inflamed.

3. Modulation and Control of Biology (System Reprogramming)

Healing means guiding cells back to homeostatic (healthy) states:

- **In vivo cellular reprogramming:** Using Yamanaka factors delivered via mRNA/lipid nanoparticles to rejuvenate tissues directly in the body.
- **Programmable gene and epigenetic editing:** Advanced systems (next-generation CRISPR) that turn genetic "switches" on or off without altering the underlying code.
- **Bioelectronics:** Controlling inflammation and organ function by precisely stimulating the vagus nerve or other neural pathways, modulating electrical signals between the cerebrum and the rest of the body to stop autoimmune diseases.
- **Smart drugs with autonomous delivery:** Nanorobots that releases therapeutic microdoses only where parameters indicate abnormalities.

Paradigm Shift: From Treatment to "Homeostatic Maintenance"

Aspect	Traditional Medicine	Systemic Medicine of the Future
Approach	Reactive (treats established disease)	Proactive (prevents deviation from homeostasis)
Target	Affected Organ or Symptom	The entire molecular and cellular network
Method	Blockbuster Chemical Drugs	Personalized, Dynamic Biological Modulators
End Goal	Chronic Disease Management	Disease Reversibility and Longevity Extension

First Practical Steps Towards This Future:

- **Bio-Data Standardization:** Open Protocols for Secure Processing of Clinical and Genetic Data by Massive AI Models.
- **Development of Closed-Loop Systems):** Automated systems for cytokines (autoimmune diseases) or neurotransmitters.
- **Rethinking regulatory frameworks:** Approval by agencies (such as FDA/EMA) of *adaptive treatment algorithms*, not just fixed molecules.

Deniplant's involvement in modulating Human Physiology

A first innovation made by Deniplant in the modulation of Human Physiology was the initiation of a **Next-generation Multi-JAK/TYK2 Asymmetric Inhibitor Portfolio with Natural Nanoparticles**.

This research and development portfolio is structured on three innovative pillars:

- **1. Asymmetric Selectivity through AI and in silico screening:** Mapping of natural bioactive compounds that exhibit high inhibition on JAK1 and TYK2 (suppressing type I interferon and IL-23/IL-17 pathways), preserving JAK2/JAK3 to protect normal hematopoiesis.
- **2. Advanced Botanical Nanomedicine:** Scaling up a natural herbal nanoparticle syrup and highly absorbable oral liquids, maximizing localized epidemic and systemic therapeutic indices, without toxic plasma peaks.
- **3. Streamlined clinical translation:** Conducting an aggressive R&D pipeline (from in silico modeling to Phase I-III clinical trials) in coordination with EMA and FDA.

*"**WHY NOW?**" The realization of a Multi-JAK/TYK2 asymmetric inhibitor based on botanical nanoparticles is possible today thanks to the recent convergence of four scientific pillars: **green bionanotechnology, predictive structural AI, sub-angstrom molecular imaging and bio-orthogonal chemistry**.*

- **The Evolution of Green Bionanotechnology:** Moving from Heterogeneous Batches to Precise and Controlled Microfluidic Self-Assembly of Uniform Botanical Nanoparticles.
- **The Structural AI Revolution (AlphaFold 3):** Atomic-Level Protein-Ligand Dynamic Modeling Enables Exploitation of the TYK2 Pseudokinase Domain for Real-Time Asymmetric Selectivity.
- **Next-Generation Cryo-EM:** Sub-Angstrom Cryogenic Microscopy Enables Real-Time Visual Capture of Receptor-Ligand Interfaces.
- **Supramolecular Engineering and Click Chemistry:** Perfect Binding of Organic Compounds on Nanoparticles Without Altering the Plant's Natural Immunomodulatory Properties.
- **Convergence with Proof of Concept (MVP Deniplant):** The technological alignment intersects with the preliminary clinical results already documented by Deniplant on cohorts of chronic patients.

How does this program change the lives of patients with immune-mediated diseases?

A plant-based nanoparticle program for asymmetric JAK.TYK2 inhibition represents a paradigm shift in regenerative medicine and immunology. This technology with its safety profile of natural compounds, radically transforms the lives of patients with immune-mediated diseases (psoriasis, Crohn's disease, ulcerative colitis, lupus erythematosus or rheumatoid arthritis, allergies.):

- **Eliminating the "sickle cell effect" on immunity:** Unlike non-selective synthetic jakinibs, asymmetric inhibition selectively targets TYK2/JAK1, leaving antiviral immunity and hematopoiesis (JAK2/JAK3) intact. Patients achieve remission without completely compromising their immunity.
- **Smart delivery through plant exosomes:** Plant nanoparticles have a natural affinity for inflamed tissues, delivering the substance directly to hyperactive immune cells.
- **Zero organ toxicity:** No need for monthly liver/kidney tests specific to methotrexate or cyclosporine; phyto-nanoparticles are completely biocompatible, eliminating liver and kidney toxicity.
- **No withdrawal syndrome or addiction:** The plant formulation restores immune homeostasis without rebound effects when stopping treatment.
- **Sustainability and low costs:** Plant biomass reduces production costs by up to 90% compared to synthetic biological products.
- **Long-term safety:** Patients with chronic diseases require lifelong treatment. Replacing synthetic drugs with a nanovegetable solution transforms a disabling

disease, lived under the specter of fear of side effects, into a perfectly manageable state, with a life expectancy and vitality similar to those of a healthy person.

Transforming high risk into clinical success (Deniplant Strategic Guide)

Deniplant coordinates interdisciplinary teams (biologists, pharmacists, clinicians) for early de-risking and bidirectional clinical translation:

[Biologists: Mechanism & Selectivity] ➔ [Pharmacists: Formulation & Stability] ➔ [Clinicians: Studies & Biomarkers]

⥁ Continuous feedback loop and clinical translation

- **Translational Alignment:** Define a unique Target Product Profile (TPP) from day one.
- **Parallel De-risking Matrix:** Validate biological selectivity (TYK2/JAK1), cGMP pharmaceutical standardization of nanoparticles and define early clinical biomarkers.
- **Rapid Go/No-Go Decisions:** Quickly move past inappropriate formulations to optimize resources.

Necessary investment and global vision

An initial budget of **£50 million** is estimated for the launch of this *"Green Bionanotechnology Platform for Asymmetric Immunomodulation"*.

Deniplant's objective is to create a distributed ecosystem of computing labs, phytochemistry centers, cGMP facilities and clinical trial consortia (with the core in the UK and global expansion).

End result: Transition from toxic oncology/immunology therapies to simple, home-administered oral syrups and drinkable solutions, achieving deep clinical remission, with zero toxicity and affordable costs.