

POCEMON

Point-Of-Care MONitoring and Diagnostics for Autoimmune Diseases

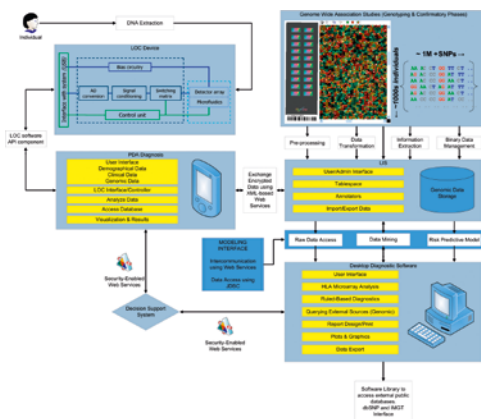
POCEMON is an advanced *portable genomic Lab-On-Chip-based platform* for detecting genetic factors predisposing to Autoimmune Diseases at *ANY point-of-care*. It will advance and promote especially primary healthcare across Europe by supporting point-of-care diagnostics, monitoring of immune system status and management of chronic Autoimmune Diseases.

Objectives of the Project

Autoimmunity, a condition where one's immune system attacks its own body tissues, is sharply on the rise. Presently, patient diagnostic tests regarding the majority of Autoimmune Disorders are mainly carried out in large-scale laboratories. The patient does not obtain the results until a few days later. Advanced **computer-based, miniaturized labs** will enable diagnostics support of genetic diseases or the patient's general state of health within a matter of minutes – at **ANY point-of-care**.

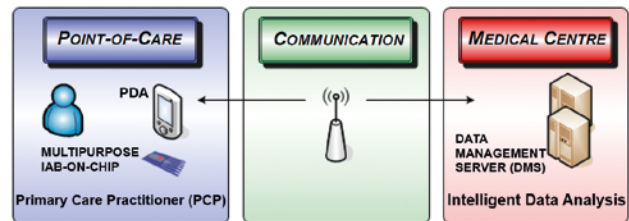
In a nutshell, POCEMON sets out to:

- support efficient diagnosis at the European primary healthcare level, now available only at large medical centres
- produce a novel, portable, fast, low-cost, user- and environment-friendly, Lab-on-Chip-based diagnostics device for Autoimmune Diseases
- identify the best “diagnostic” genetic variants predisposing to Autoimmune Diseases in people living far from urban centres
- implement a set of complex diagnostic software for intelligent genomic data analysis and interconnection with medical platforms/records hosted at large medical centres



Project Description

Innovative “smart” micro-products spawn extremely effective solutions with applications to medicine and modern genomics. Driven by the need for enhanced management of chronic diseases at the patient's site, sophisticated micro-technologies and portable diagnostic micro-labs are, thus, the **new healthcare trend** in the new age.



POCEMON, a **pocket-sized laboratory** (i.e. a laboratory fitted onto a micro-chip) will change the way of diagnostics, prognostics and treatment. Capable of instantly analyzing the DNA of a patient's blood sample and linked to a remote central server hosting a set of complex diagnostic software, POCEMON seeks to identify genetic variants predictive for **Rheumatoid Arthritis (RA)** and **Multiple Sclerosis (MS)**. Besides results from pilot studies, POCEMON will be validated with respect to its **SNP-based approach**, its diagnostic **Lab-On-Chip detection capability**, **novel care pathways** and real-world use by primary care experts.

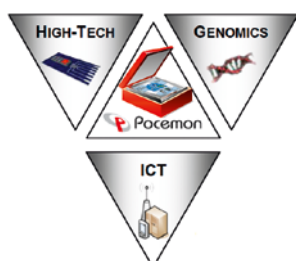
POCEMON emanates from the synergic intersection of Nano-, Micro-, Bio-, and Information Technologies for healthcare applications featuring **three interdisciplinary domains**:

- **High-Tech Microsystems:** A 2nd generation HLA diagnostic Lab-On-Chip to detect a large number of genetic polymorphisms.

ENVISAGED SCENARIO

An individual with symptoms of autoimmunity visits his Primary Care Practitioner (PCP). The PCP performs a genomic exam using the POCEMON diagnostic platform. Starting with an individual patient's blood sample POCEMON automatically runs the analysis and gives feedback regarding the patient's genomic results via the PDA screen. The physician pre-diagnoses an Autoimmune Disorder (e.g. Rheumatoid Arthritis), subsequently sending the data to the central server of the system, located remotely at a medical centre. POCEMON's decision support system extensively processes all patient-specific data thereby facilitating the assessment of a patient's predisposition to a disease.

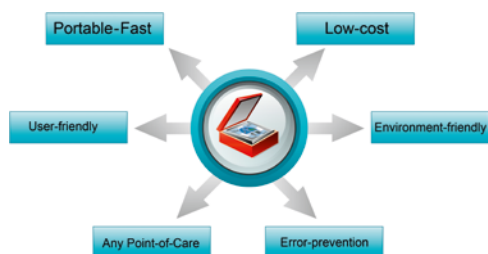
- **Medical Genomics:** HLA genotyping to identify and validate the best set of “diagnostic” SNPs (Single Nucleotide Polymorphisms) associated with RA and MS Autoimmune Diseases.
- **ICT Systems:** Complex set of software to control and analyze the flow of information and how this information is delivered to the primary healthcare community.



Expected Results & Impacts

By supplying PCPs with a diagnostics support platform, POCEMON exerts a **profound impact on primary healthcare diagnostics for Autoimmune Diseases:**

- a) Numerous advantages over prevailing **diagnostic techniques:** Higher quality of care, shorter and less complex diagnostic procedures and painful medical examinations, more technology-oriented healthcare, cost reductions in hospitals and large-scale screening for Autoimmune Disorders are the result.



- b) Efficient **patient management:** Genetic testing combined with selective information about the patient’s phenotype may provide healthcare professionals with further indicators of the likelihood of disease. Beyond identifying susceptibility to RA or MS, POCEMON helps to predict the *likely course and severity of the disease*.
- c) **Pharmacogenetics and treatment:** Additional information regarding a patient’s pharmacogenetic susceptibility to successful treatment with selected therapies (or risk of adverse reaction) would be a valuable asset to RA/MS healthcare specialists. Existing protocols for RA and MS diagnosis fail to predict the potential of therapeutic intervention response and possible adverse reactions to drug therapy in patients.
- d) **Predominant clinical pathways:** Adaptation of the current clinical pathways to the envisaged scenario by incorporating the POCEMON device, indicates the reduced time scale required for the patients to complete the patient pathway and reach the most suitable, safe and effective treatment for that patient.

The prediction of a patient’s *pre disposition* to RA or MS, incorporating *environmental* as well as *phenotypic* factors, and providing *decision support* in developing a *pharmacogenetics*-based patient treatment plan may be of extensive benefit to patients and healthcare commissioners alike.



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- PHARNEXT S.A.S. (France)
- University of Milan (Italy)
- University of Ioannina (Greece)
- ANCO S.A. (Greece)
- University of Stockholm (Sweden)
- The Cyprus Institute of Neurology and Genetics (Cyprus)
- The Rotherham NHS Foundation Trust (UK)
- LKH Villach (Austria)
- TALANTON S.A. (Greece)
- SPIRIT S.A. (Greece)
- IXTENT s.r.o. (Czech Republic)

Timetable: from January 2008 to June 2012

Total cost: € 9,847,600

EC funding: € 7,470,000

Instrument: IP

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KEYWORDS

Point-of-care, Lab-On-Chip (LOC), Autoimmune Diseases, Microarrays, Human Leukocyte Antigen (HLA), Single Nucleotide Polymorphism (SNP)