

# Combinatorial Innovation for Inflammation

This platform uses a biomarker signature to alert of vitamin D deficiency and monitors inflammation in the body

Reference: Innovation for Inflammation



Source: <https://stock.adobe.com/uk/423369166>

## IP Status

Patented

## Seeking

Development partner, Commercial partner, Licensing, Seeking investment

## About LMU Munich

Ludwig-Maximilians-Universität München is the University in the heart of Munich. LMU is recognized as one of Europe's premier academic and research institutions. The LMU Munich community is engaged in generating new knowledge for the benefit of society at large.

# Background

Research has shown that chronic inflammation is associated with several major diseases affecting millions of people in Germany, e.g. neurological diseases (e.g. 250.000 multiple sclerosis patients), psychiatric disease (e.g. 400.000 schizophrenic patients), cancer (1.7 Mio cancer patients), and heart disease (e.g. 2.5 Mio heart failure patients). The burden associated with these illnesses and the socioeconomic costs that are inevitably incurred is extremely high. There is a lack of sensitive biomarkers to measure systemic inflammation. High-sensitivity C-reactive protein (hsCRP) has been proposed as a novel biomarker for inflammation as C-reactive protein (CRP) alone was not sensitive enough. Innovative technologies are therefore urgently needed to measure low-grade inflammation and to mitigate the risk of adverse health outcomes.

This combinatorial diagnostic innovation for inflammation is protected in the fields of multiple sclerosis, schizophrenia, Alzheimer's disease, Parkinson's disease, mood disorders, dementia, neurodevelopmental disorders (e.g. autism), cancer, diabetes, asthma, ulcerative colitis, psoriasis, metabolic disorders and heart disease.

## Tech Overview

The combinatorial diagnostic innovation for inflammation will be based on lateral-flow technology and will inform about the level of vitamin D and inflammation markers (matrix-metalloproteinase-9 (MMP-9) and Interleukin-8 (IL-8)) in the sample. The intensity of coloured bands in the test line region is vitamin D and inflammation marker-concentration-dependent. The assay will be analysed with the help of a reader and a smartphone app will report the results back to the end-user. Sana-D's combinatorial diagnostic innovation for inflammation is very sensitive and can detect low-grade inflammation, which will help physicians stratify patients and monitor disease activity and treatment response. As inflammation is linked to vitamin D levels, Sana-D's combinatorial diagnostic innovation for inflammation will also inform about vitamin D status and whether supplementation is necessary (Figure 1).

### Further Details

- Ramagopalan SV; Dobson R; Meier UC and Giovannoni G. 2010. Multiple sclerosis: risk factors, prodromes, and potential causal pathways. *Lancet Neurol.* 9, 727-3.
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- Sisay S; Lopez-Lozano L; Mickunas, M; Quiroga-Fernandez A; Palace J; Warnes G; Alvarez-Lafuente R; Dua P and Meier UC. 2017. Untreated relapsing remitting multiple sclerosis patients show antibody production against latent Epstein Barr Virus (EBV) antigens mainly in the periphery and innate immune IL-8 responses preferentially in the CNS. *J Neuroimmunol*, 306, 40-45.
- Biela A; Watkinson; M, Meier UC; Baker D; Giovannoni G; Becer DR and Krause S. 2015. Disposable MMP-9 sensor based on the degradation of peptide cross-linked hydrogel films using electrochemical impedance spectroscopy. *Biosens Bioelectron*, 68, 660-667

# Stage of Development

Technology readiness level 3: proof of concept with clinical samples in laboratory environment.

## Benefits

- Increased sensitivity
- Ability to monitor low-grade inflammation
- Ability to measure inflammation together with vitamin D status
- No POC tests on the market, which combine vitamin D status with inflammation markers
- Low costs

## Applications

- Neurological disease (e.g. multiple sclerosis, Parkinson's disease)
- Psychiatric disease (e.g. schizophrenia, mood disorder, Alzheimer's disease, dementia)
- Neurodevelopmental disorder (e.g. autism)
- Autoimmune disease (e.g. psoriasis, ulcerative colitis, diabetes)
- Cancer
- Asthma
- Heart disease
- Metabolic disorder

## Opportunity

Seeking development partner, commercial partner, licensing and investment.

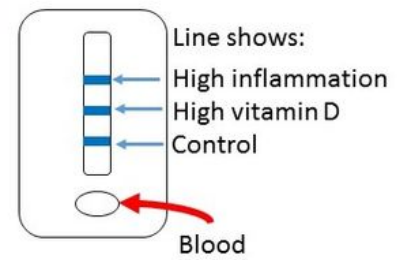
## Patents

- The European patent "BIOMARKERS FOR INFLAMMATORY RESPONSE" (Patent number: EP-3011344, Publication number: 20160131666) has been granted on 15 May 2020. The US patent is currently under examination.

## Appendix 1

Figure 1

Vitamin D	Inflammation	Outcome
HIGH	LOW	The NORMAL / BEST condition
LOW	HIGH	Indicates that inflammation is linked to Vitamin D level – Take Vitamin D supplements
HIGH	HIGH	Indicates that inflammation is not linked to Vitamin D level – Consult GP (additional anti-inflammatory drugs)
LOW	LOW	Indicates low inflammation level, but also low levels of Vitamin D – Take Vitamin D supplements



**For further information, please contact us.**

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