## **i PROLEPSIS**

iPROLEPSIS - A novel digital care ecosystem for people with psoriatic arthritis

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# The iPROLEPSIS project

<b>i</b> PROLEPSIS		
<b>Psoriatic arthritis</b>	15	
inflammation explained	partners	7M €
through multi-source		budget
data analysis guiding a	4 yrs	
novel personalised	duration	HADEA
digital care ecosystem		funding

# **Multidisciplinary consortium**



# **Psoriatic Arthritis (PsA)**

Chronic, progressive, inflammatory

Joint inflammation and pain

1-2% population affected

**30-50**yrs age of diagnosis

Transition to PsA is often missed and not timely treated 20-40%

of people with psoriasis develop PsA Diagnosis based on physical examination

## Difficult to predict flares

# The iPROLEPSIS vision









Key (actionable) inflammation drivers

Novel digital and wet/dry biomarkers

Personalised interventions for symptoms remission

Digital healthcare tools for HCPs and patients



## The iPROLEPSIS research



data DEPAR (NL) MONITOR (UK) ReumaPT (PT)

**Existing clinical** 



Prospective data Clinical Environmental Gut microbiome DNA

Key inflammation drivers



#### Optoacoustic imaging Detect changes in joints and skin microvasculature



Mast cells Identify their role in PsA inflammation presence and progression

**Novel biomarkers** 



#### **Digital biomarkers**

PsA symptoms tracking via passive data and active tests

#### **Predictive models**



PsA progression (disease activity, flares)

PsA risk

## Digital biomarkers and predictive models



## The iPROLEPSIS methodological pillars







## **Co-creation**

User research and engagement of key stakeholders over the course of R&D activities

## **Trustworthy AI**

Develop and evaluate the iPROLEPSIS tools according to ethical, inclusive and trustworthy Al principles (EU AI act, EU MDR)

## **Clinical validation**

Well-designed, sufficientlypowered proof-of-concept multicenter studies

## The iPROLEPSIS ecosystem

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## Screening and monitoring





#### miPROLEPSIS

Smartwatch data Smartphone data Active tests Self-reports

#### miPROLEPSIS Lite

Smartwatch data summaries Smartphone data Self-reports

#### Explainable AI engine

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PsA risk model PsA exacerbation model Digital biomarkers

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Healthcare provide

miDashboard

Monitoring PsA symptoms Flares prediction Related health insights

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## The iPROLEPSIS ecosystem

Interventions



#### biAURA app

Mitigation of sleep disturbances and stress based on binaural beats



Auditory illusion created by the brain when 2 tones of slightly different frequencies are presented to each ear.

The brain perceives an additional tone at the difference frequency between the 2 tones

## The iPROLEPSIS ecosystem

## Interventions



#### biAURA app

Mitigation of sleep disturbances and stress based on binaural beats



Several mini-games targeting exercise, diet, emotions, stress etc.

physical activity and nutrition

# **Clinical studies**



## **Innovation and benefits**

# **Key innovations**



Symptom tracking and forecasting of disease exacerbations based on multisource objective data, not only PROs



Fusion of smartwatch and smartphone data, collected continuously (24/7), and unobtrusively



Holistic investigation and explanation of the underlying mechanisms of PsA utilising digital, clinical, environmental, gut microbiome and genetic data



Gamified interventions tailored to the needs of people with PsA

# **Benefits to stakeholders**



Advanced PsA management towards the prevention of permanent joint damage and improvement of QoL



Prevention of flares via the identification and avoidance of triggers



Early detection of changes allowing for prompt interventions



Collection of longitudinal RWE data yielding better insights into the disease

People empowered to be proactive and take better-informed decisions

Less in-person visits; Decrease of healthcare costs

Improved clinical trials efficiency



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# **i PROLEPSIS**

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