Webinar | IMI2 - Call 7 ‘Pathological neuron-glia interactions in neuropathic pain’

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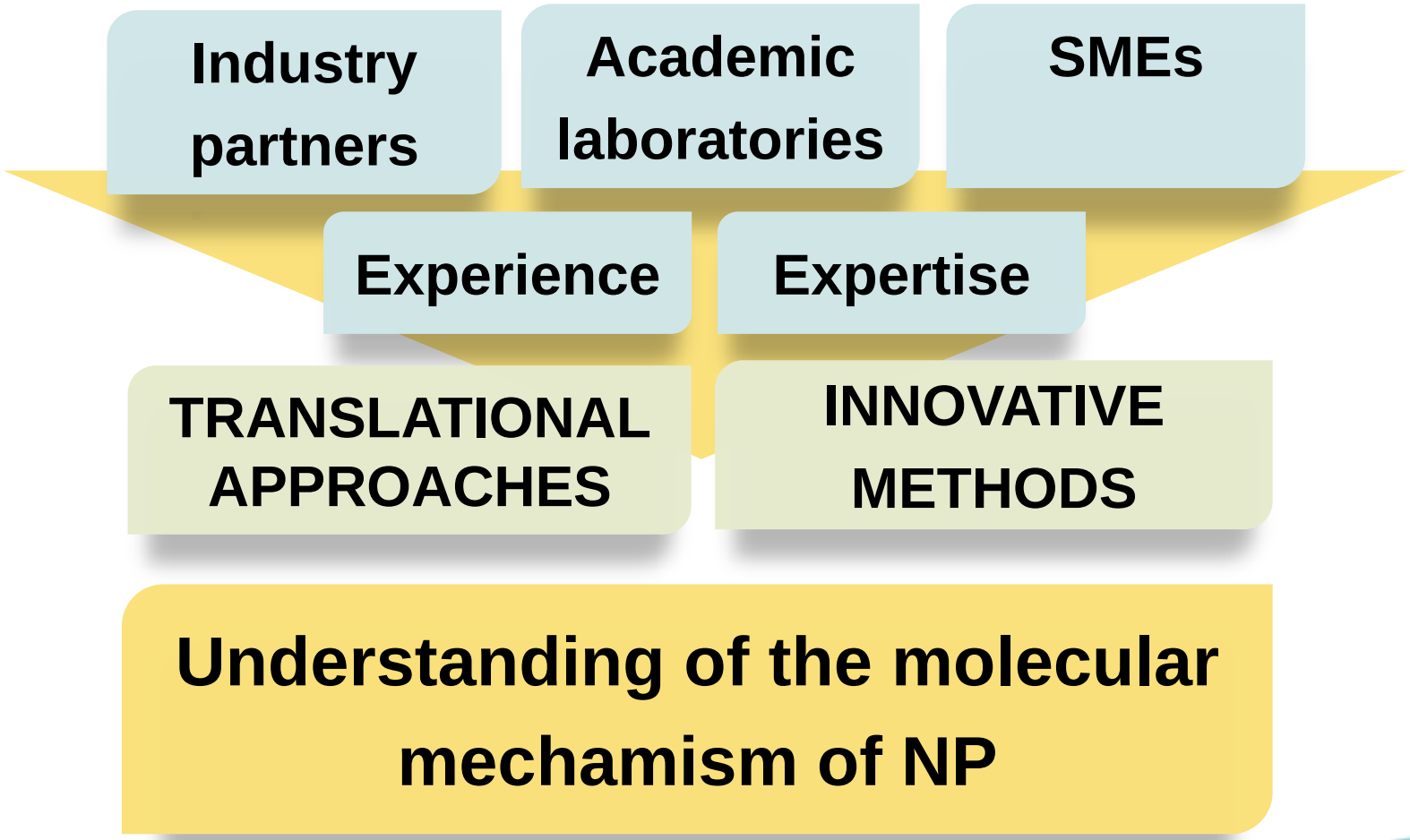
Need for public-private collaboration

- Identifying pathological mechanisms behind the development and maintenance of Neuropathic Pain (NP), and identifying ways to restore is a very ambitious and complex undertaking



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Objectives of the full project

- Characterization and identification of key mechanisms of pathological Neuron-Glia Cross-Talk (NGCT) involved in the development and maintenance of chronic NP which can be modulated to provide curative therapeutic intervention in NP patients.

- Development of robust and validated rat and human screening test systems of selected indicators of pathological NGCT for discovery of clinically efficacious curative analgesics.

Pre-competitive nature

The consortium, consisting of academia, Small and Medium sized Enterprises (SMEs), and the European Federation of Pharmaceutical Industries and Associations (EFPIA), will be working in a pre-competitive landscape where:

- Experience and expertise will be openly shared.
- Efforts will be combined for developing basic research and practical tools needed to facilitate and boost drug discovery in the pain field.
- Regular meetings and workshops will be held to openly discuss results and progress.
- Tools and results will be made available to the scientific community.
- Interaction with other consortia will be actively sought to identify synergisms.

Expected impact on the R&D process

- Accelerate research aimed to help understanding the role of NGCT in the development of NP.
- Establishment of a characterized and high quality tools to support and facilitate exploring the role of NGCT in NP.
- Identification of druggable modulators of neuron-glia interactions to modulate neuron-glia activity or related pathways to treat NP.
- Establishment of translational tools to support future clinical studies.
- Deployment of synergisms across consortium partners.
- Sharing precompetitive tools within consortium partners and scientific community .
- Maximisation of impact by combining multiple approaches.

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Suggested architecture of the project

Work Package 1	Project Management.
Work Package 2	In-depth analysis of *in vivo* rat models of chemotherapy- and Spinal Nerve Ligation (SNL)-induced NP.
Work Package 3	Characterization of NGCT and development of a screening assay in rat nociceptive tissue using High Content Screening (HCS) microscopy.
Work Package 4	Identification of biomarkers relevant to analysis of NGCT in rats.
Work Package 5	Generation of human induced Pluripotent Stem Cells (hiPSCs)-derived neuron-glia co-cultures.
Work Package 6	Develop HCS assays based on hiPSC-derived neuron-glia co-cultures.

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Expected contributions of the applicants

Cell cultures (Rat tissue & Human iPSCs)

High Content Screening

- **Analysis of changes of signaling pathways *in vitro* rat neuron-glia test systems (tissue e.g. Peripheral nerves (PNs), Dorsal Root Ganglia (DRG) and Spinal Cord (SC) from naïve and NP animals)**
- **Establishment of test systems with neurons and glia derived from hiPSCs.**
- **Analysis of signaling pathways in human neuron-glia test systems.**
- **Establish equivalent *in vitro* rodent and human neuron-glia test systems.**
- **Analysis of translatability between *in vitro* rat & human nociceptor systems**

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Expected (in kind) contributions of EFPIA members

Rat chemotherapy-induced NP

Rat nerve ligation-induced NP

- **Pain behaviour (e.g. mechanical & cold allodynia, thermal hyperalgesia)**
- **Electrophysiology (PNs and SC)**
- ***In vivo* Neurochemistry (SC microdialysis)**
- **Inmunohistochemistry & molecular testing (e.g. PCR, Western blotting, ELISA)**
- **Sampling of tissue (e.g. PNs, DRGs, SC), plasma and CSF**
- **Tool cpds., analgesic reference cpds. and novel drugs**

Joint scientific leadership, coordination and project management

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What's in it for you?

PUBLIC HEALTH

Availability of more efficacious, diverse, and even curative, treatments for NP.

GOVERMENT AND PAYERS

Reduction of treatment costs due to higher clinical efficacy.

ACADEMIA

Advance current knowledge of neuropathic pain and establish new tools for research into NGCT.

INDUSTRY

Establish new read-outs, tools and biomarkers for better drug selection, increasing successful translation into the clinic, reducing costs and time of developing new drugs.

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Key deliverables of the full project

- In-depth analysis of NGCT to identify key mechanisms involved in the development and maintenance of chronic NP
- Development of *in vitro* rat screening assays based on High Content Screening (HCS) microscopy that resemble the *in vivo* situation, in particular, the complex neuron-glia relationship present in NP states
- Identification of biomarkers of pathological NGCT in rats
- Development of *in vitro* human screening assays based on differentiated human iPSCs and HCS microscopy

EFPIA participants

Indicative duration of the project	**The indicative duration of the action is 36 months.**
Indicative budget	**EFPIA in kind contribution: EUR 1 500 000.** **IMI2 contribution: EUR 1 500 000.**

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Questions?

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