Programa Cooperación Farma-Biotech
Neurociencias

Microneurography
An opportunity for translational drug development in neuropathic pain

neuroscience technologies

Barcelona, 15 de febrero 2011

CataloniaBIO
Associació catalana d'empreses de biotecnologia

MEDICAMENTOS INNOVADORES
Plataforma Tecnológica Española

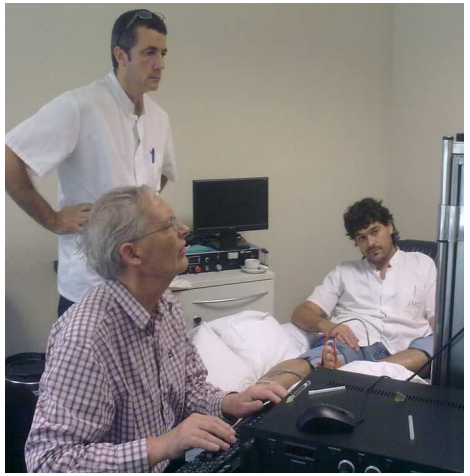
farmaindustria

Content

1. The Company
2. The Microneurography
3. Research Services
4. Availability for cooperation

Neuroscience Technologies

- Neuroscience Technologies is a biomedical company with expertise in human and animal pain neurophysiology.
- We help the pharmaceutical and biotech industries in assessing the activity of new compounds acting on the peripheral nervous system.
- Our services provide a direct translation of results from basic research to the clinical setting.



Background

- Incorporated in 2005
- First research contract: 2-year clinical and preclinical studies for a big pharma company
- Staff 14 people
- 2 preclinical and 1 clinical fully equipped labs in BCN
- 1 preclinical lab in London (KCL, October 2010)
- Activity in 2009: 10 new contracts (big pharma & biotech, University of Cambridge), 3000 patients clinically evaluated
- Steadily publishing peer reviewed science papers in high ranking journals

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Chairman

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Member Advisory Board, Institute of Micro- & Nanotechnology
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Vice-Chairman

Founder, Owner and CEO of Neuroscience Technologies
Medical Doctor from the Autonomous University of Barcelona
Specialty in Cardiology from the University of Barcelona
Senior Executive Program by ESADE Business School

Jordi Serra
Member

Founder, Owner and CSO of Neuroscience Technologies
Medical Doctor from the University of Barcelona
Specialty in Neurology from the University of Barcelona
Senior Research Felow of Neuorology,Oregon Health&Sciences University, Portland, Oregon, USA

Elena Cuatrecasas
Attorney
Company Secretary

Corporate lawyer at Cuatrecasas, Gonçalves Pereira
Specialized in the pharmaceutical, biotechnology and health sector
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Master of Laws, University of London
Member of the Barcelona Bar Association

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Director in Marketing at Pfizer, New York
Hofstra University School of Law, New York

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Cristina Quiles
CEO

- Specialty in Cardiology, University of Barcelona
- Senior Executive Program, ESADE Business School
- Global Growth Program for Entrepreneurs by Ken Morse, Director of the MIT Entrepreneurship Center
- Member of the Executive Board of Barcelona Biohealth and Business School (Knowledge & Innovation Community, European Institute of Innovation and Technology)
- Member of CataloniaBio Board of Directors
- Member of the Spanish Technological Platform on Innovative Medicines Organizational Committee, Farmaindustria

Jordi Serra
CSO

- Specialty in Neurology, University of Barcelona
- Senior Research Fellow of Neurology, Oregon Health and Sciences University, Portland, USA
- Member of the Research Committee and the Taxonomy Committee of the International Association for the Study of Pain
- National Delegate from Spain for the Pain Panel of the European Federation of Neurological Societies
- Founder of the Special Interest Group on Neuropathic Pain of the Spanish Society of Neurology
- Co-founder of the Pain Medicine Section of the American Academy of Neurology

Joan Aguilà
General Manager
CFO

- Industrial Engineer (UPC Polytechnic University of Catalonia)
- 30 years in IBM. Professional services and business development management
- Professor of Management Quantitative Methods, UPC
- Founder and partner of ISETI Consulting
- Mentor of entrepreneurs and SME executives

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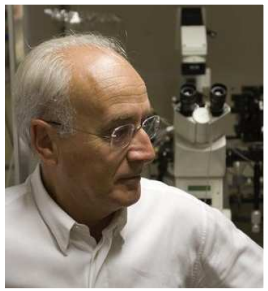

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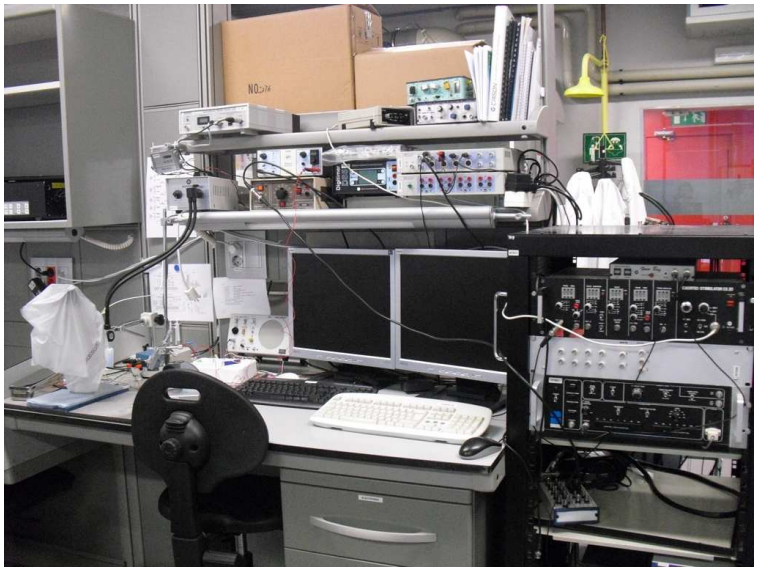
NT Services

- Preclinical pharma/biotech services
- Clinical pharma services
- Patient services

NT Preclinical Services

Assessment of efficacy of new drug candidates, quantification of activity in nociceptors by:

- Microneurography
- Multiple Excitability Measures
- Animal pain models: CCI, SNL, STZ, crush, chemotherapy, antiretroviral, etc.
- High throughput library screening (automated patch clamp system)

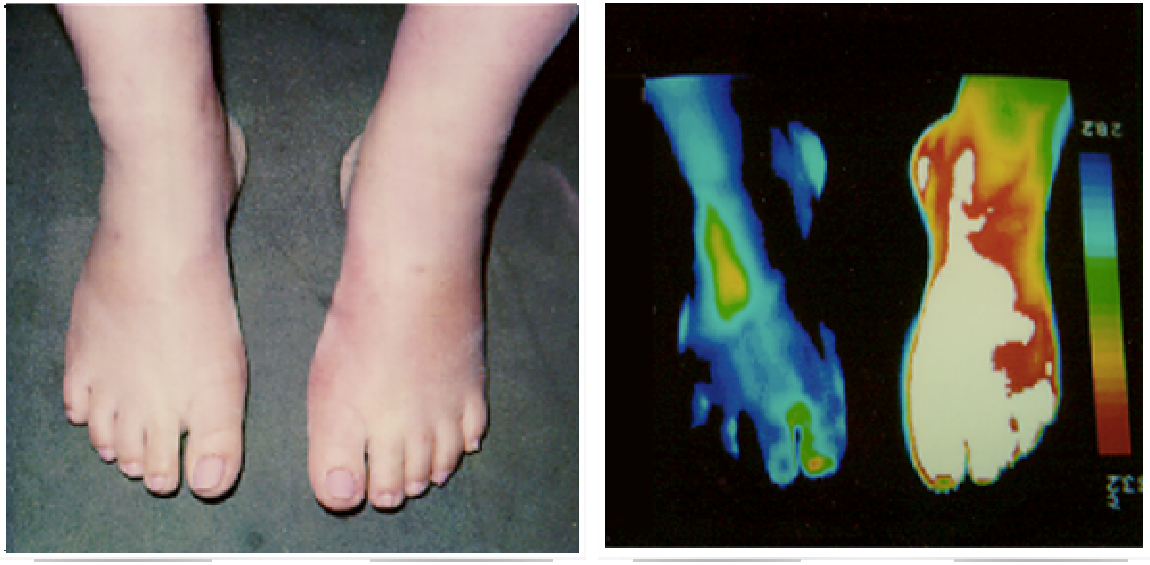


NT Clinical Services

Mechanistic, Proof-of-Concept clinical studies by detection and quantification of abnormal activity in nociceptors in human volunteers and patients by:

- Microneurography (18 years experience)
- Multiple Excitability Measures
- Multiple human pain models: capsaicin, ischemia, UVB, NGF, etc.
- State-of-the-art neurophysiology: laser evoked potentials, contact heat evoked potentials, quantitative sensory testing, EMG/NCS, skin immunohistochemistry, etc.

NT Patient Services

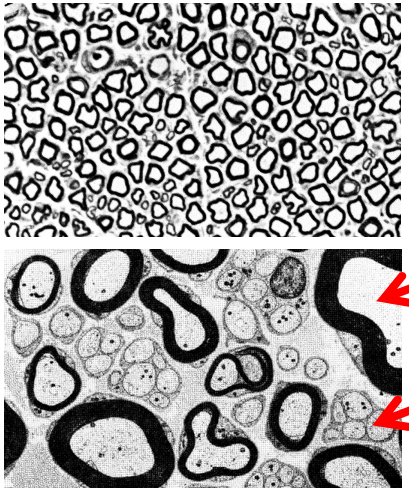


State-of-the-Art facilities for the assessment of nerve fiber function: diabetes, postherpetic, small fiber neuropathies, neuropathic pain, etc.

Scientific Background

Detection and quantification of C - nociceptor activity: explanation of our technology

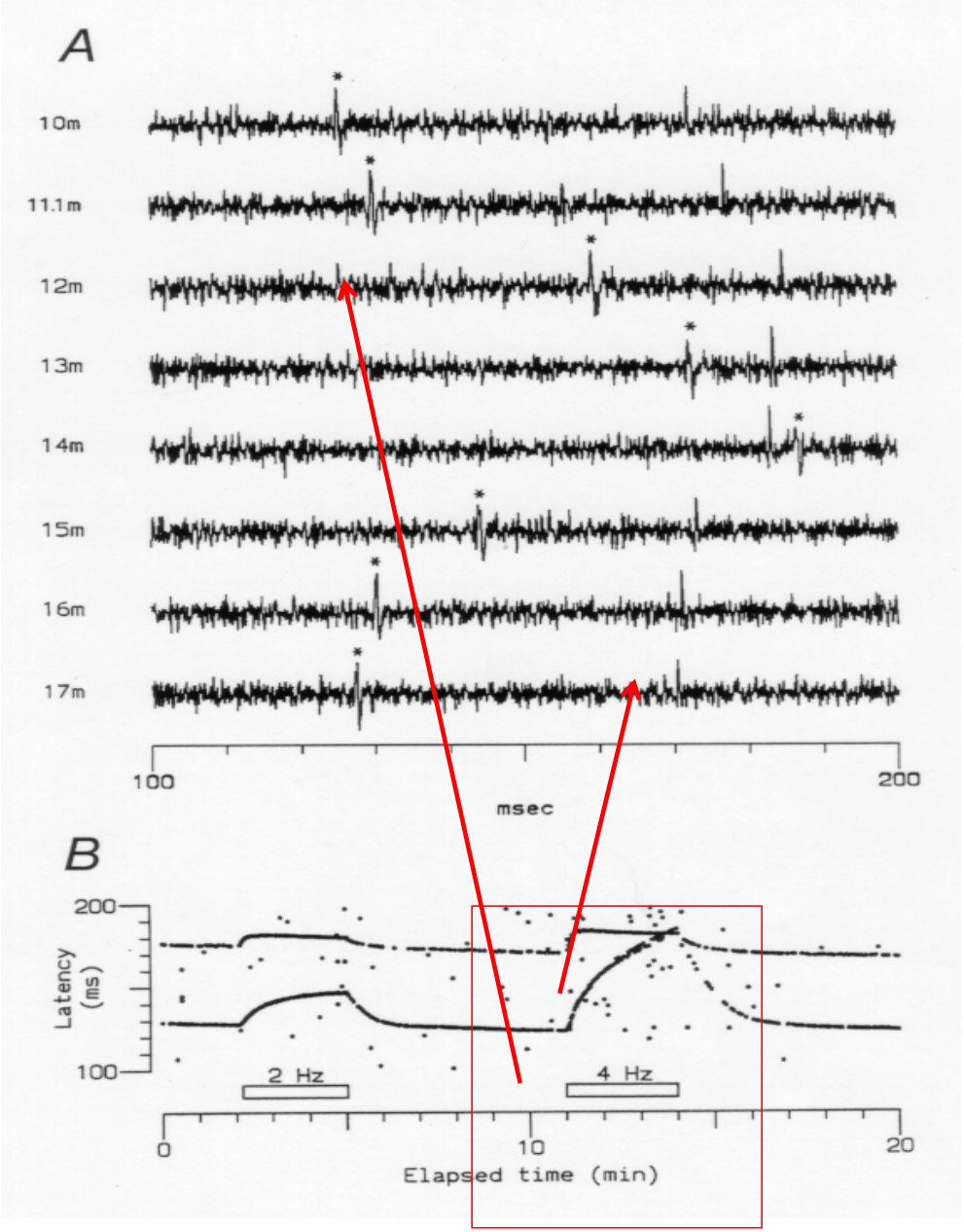
Microneurography



Types of axons

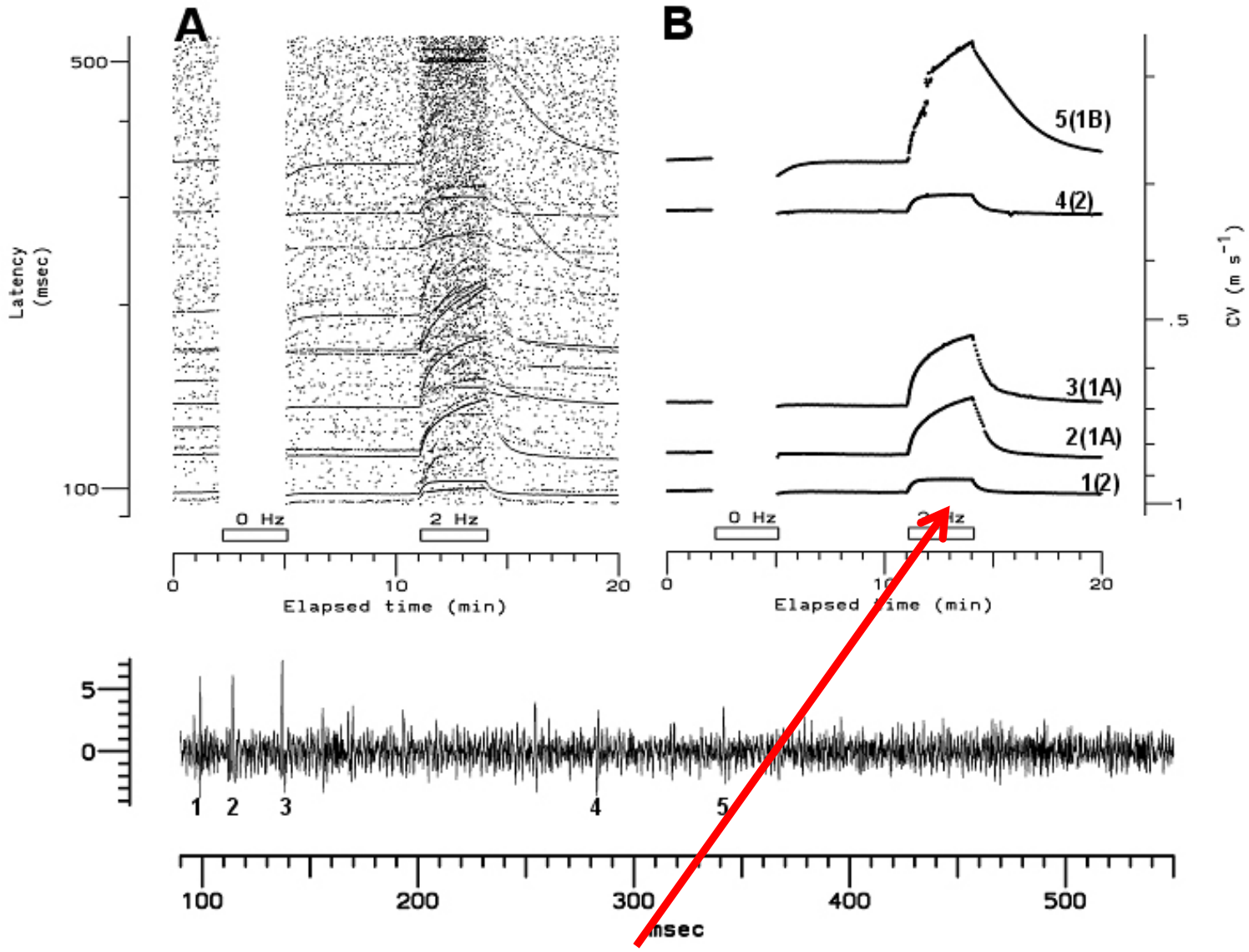
Myelinated

Unmyelinated



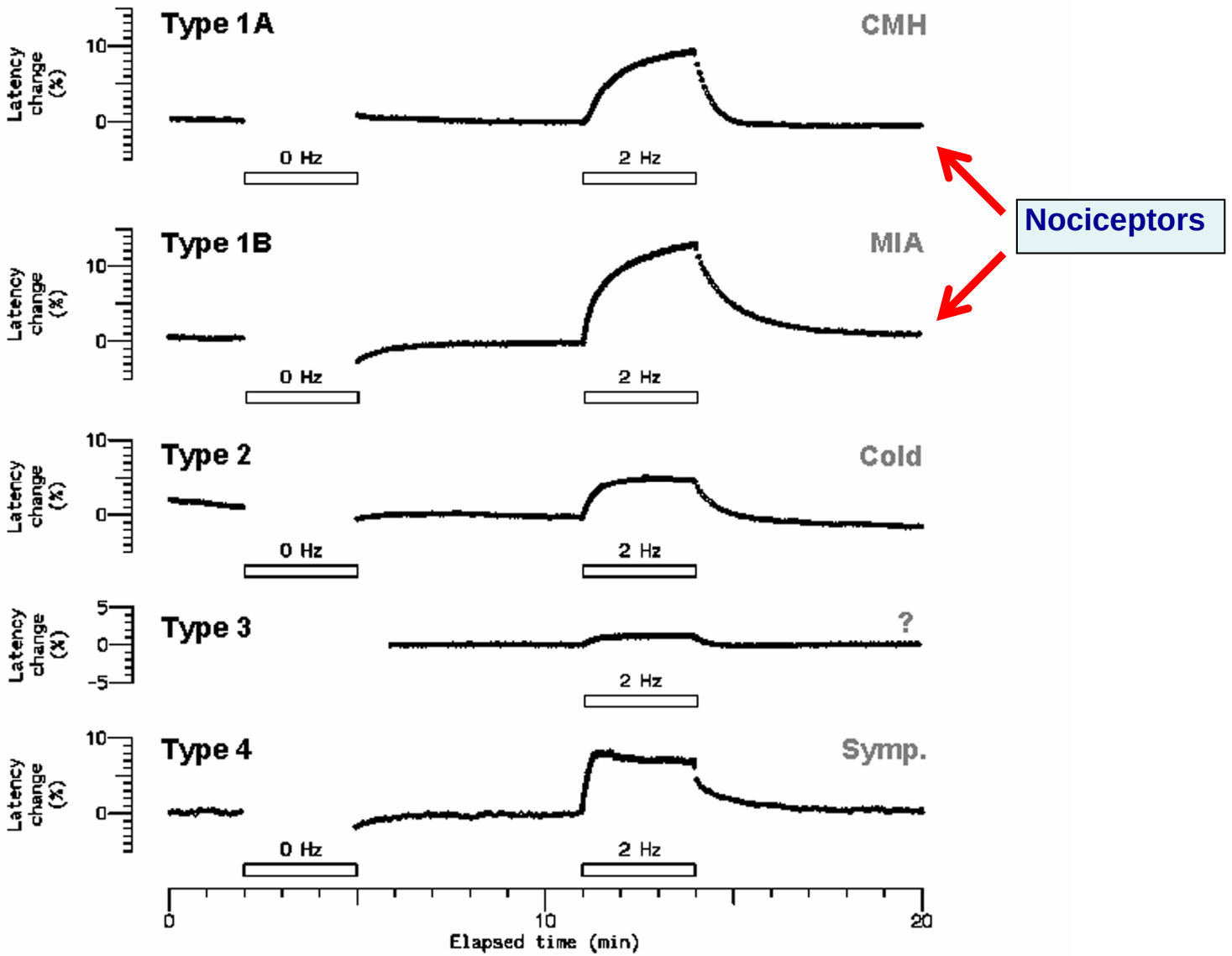
Membrane properties of C-fibers allow classification into functional subgroups

Unmyelinated C-fibers



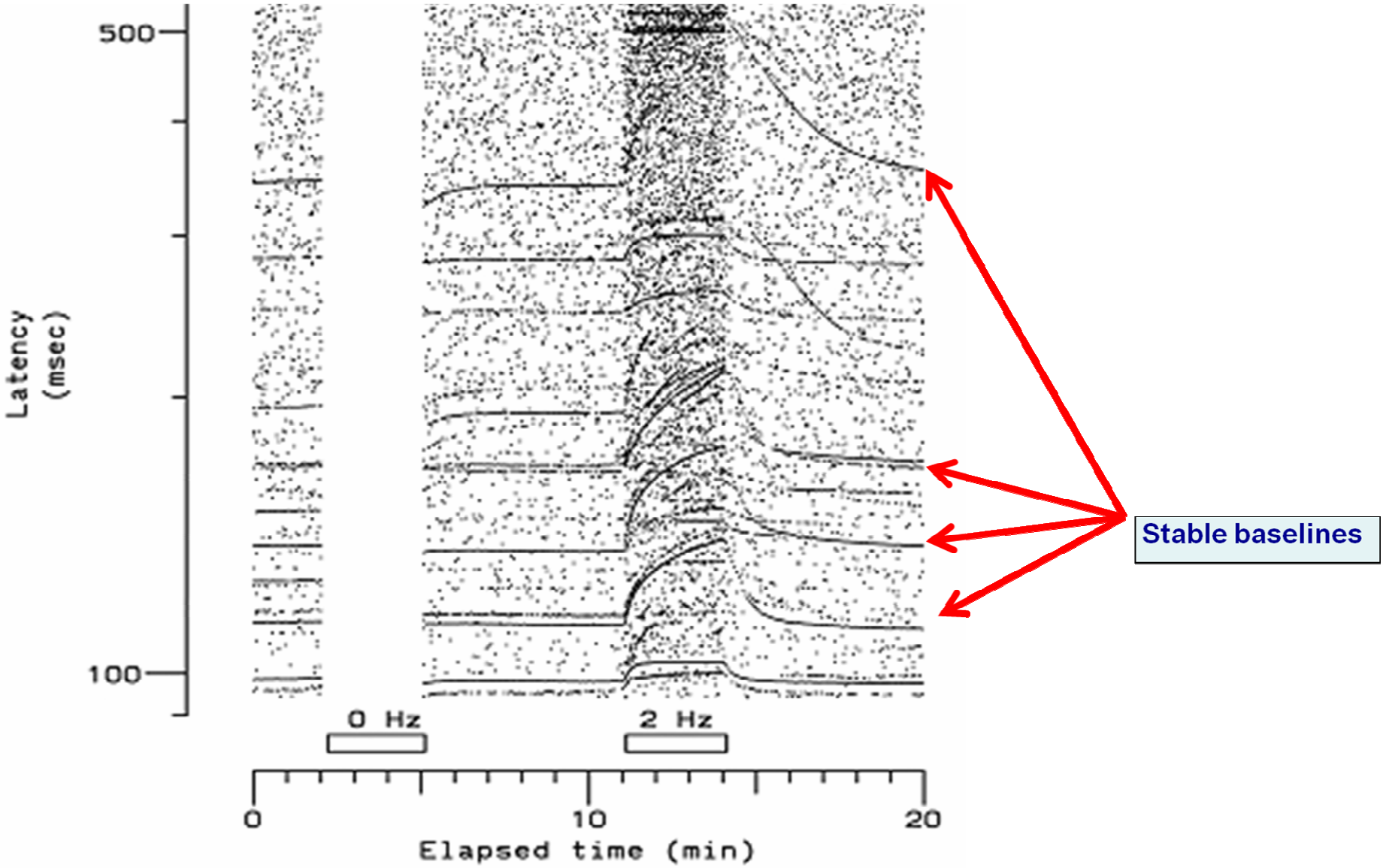
C-nociceptors have characteristic profiles of activity-dependent slowing

Types of peripheral nerve C-fibers



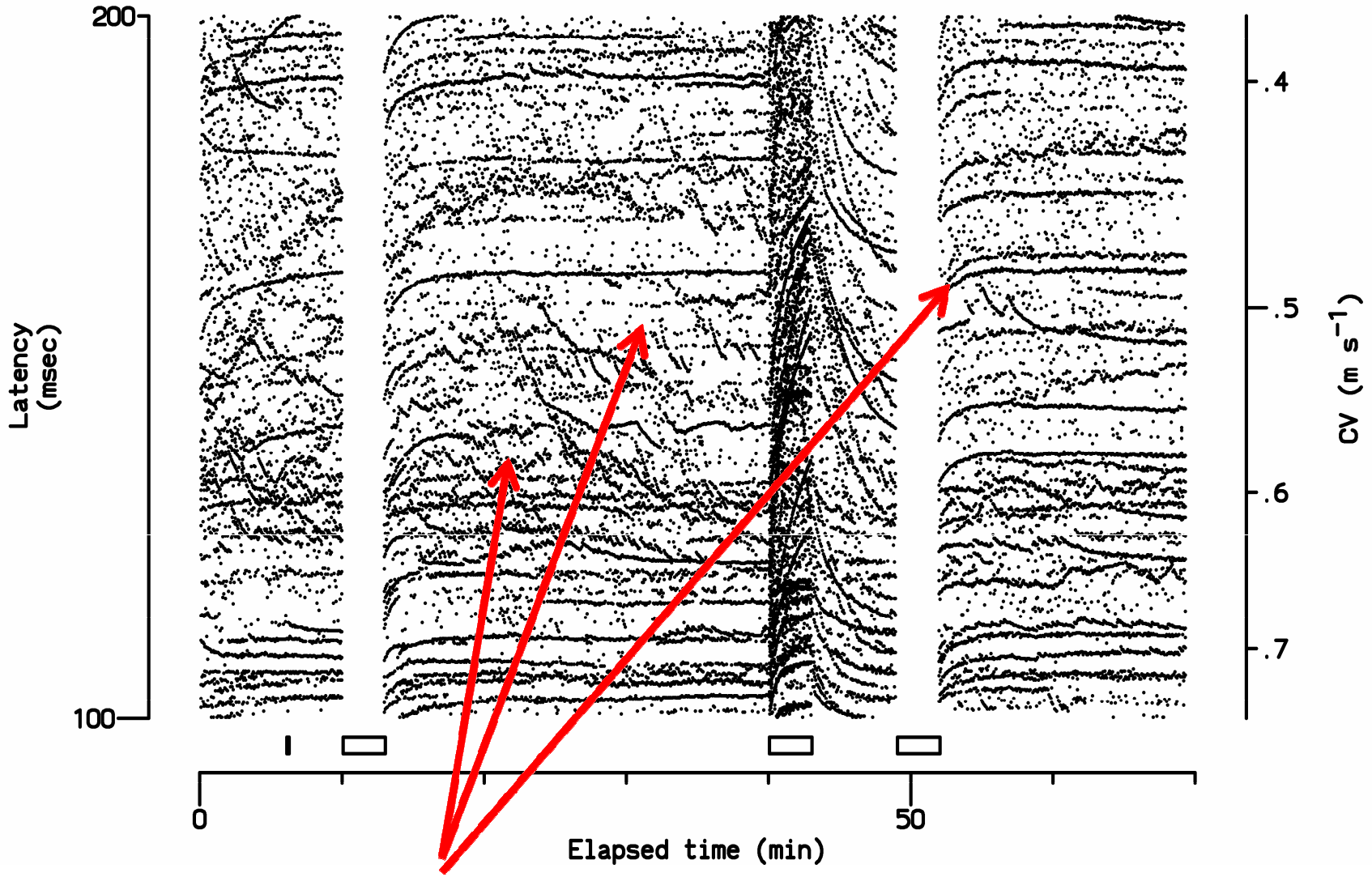
We can distinguish 6 types of C nerve fibers in humans and other mammals (rodents)

Normal C-nociceptor fibers



Normal nociceptors do not have spontaneous activity:
they produce stable, flat baselines

Pathological C-nociceptor fibers

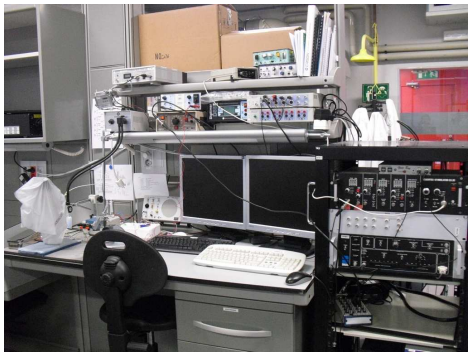


Injured nociceptors in painful neuropathy are spontaneously active: irregular baselines

Research Services

Both in animals and humans

Microneurography: proprietary analysis software **Micro-NT©**

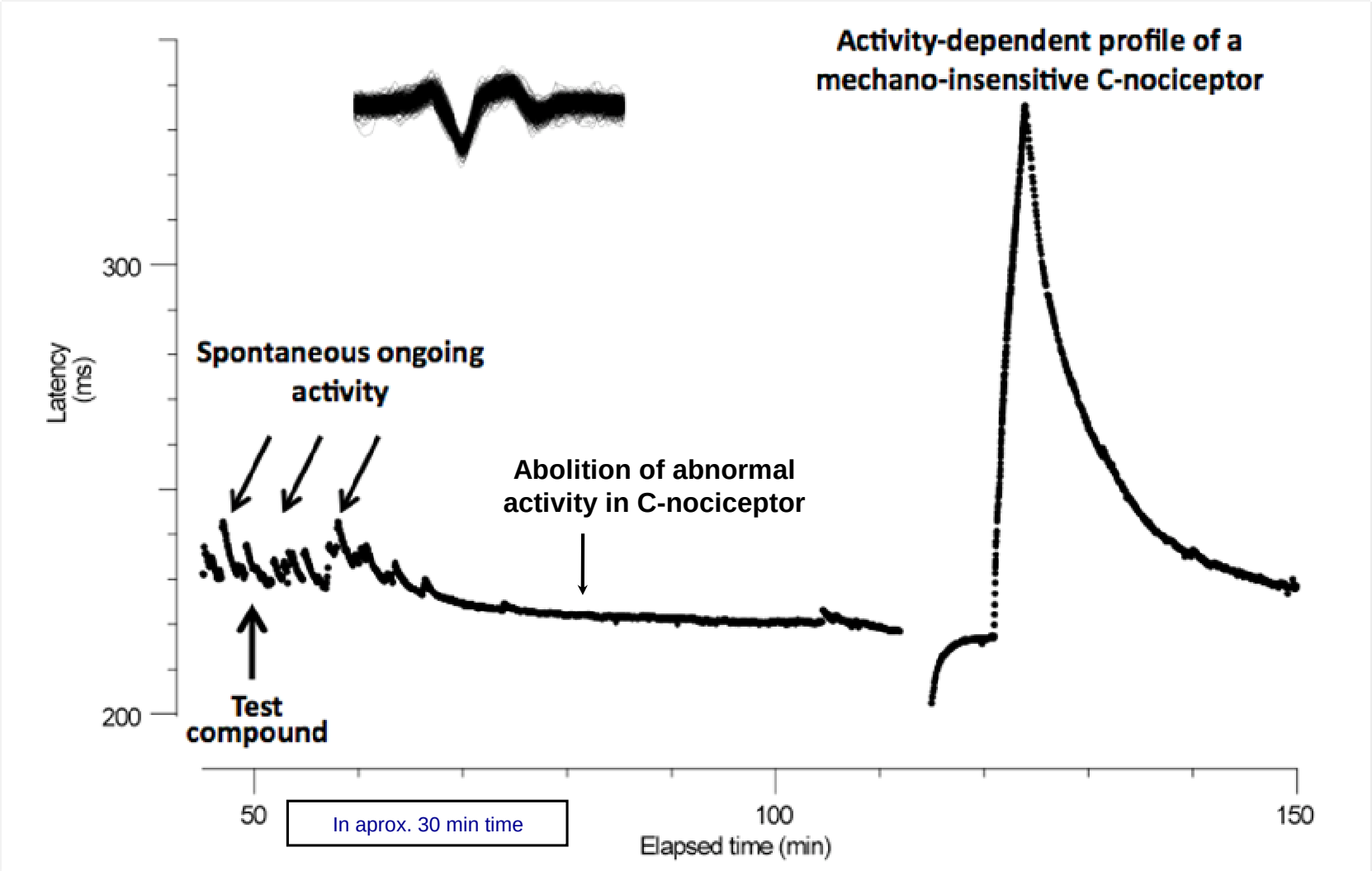


- **NT-ectopia© :** Quantification of effect of compounds on **spontaneous pain** correlate.
- **NT-transduction ©:** Quantification of effect of compounds acting on the **transductor** molecules (for ex., efficacy of TRPV1 antagonist, effect of capsaicin).

Nerve excitability studies:

- **NT-mem ©:** Quantification of effect of compounds on multiple axonal **ion channels**.
- **Proof of concept, "mechanistic" studies. Expertise in painful neuropathies**: Diabetic, traumatic, small fiber neuropathies.

NT-ectopia©: example from “in-house” program



NT assays allow early and rapid in-vivo screening
of compounds thought to have an effect on nociceptors

Typical preclinical and clinical study designs

Preclinical

- Several neuropathic pain models available (crush, SNL, CCI, STZ, chemotherapy, UVB, etc)
- N=40 animals, 3 months time
- Example: “A Randomized, Blind, Vehicle-Controlled Study to Assess the Behavioral and Electrophysiological Effects of XXXX in a Rat Model of Streptozotocin-Induced Peripheral Neuropathy”

Clinical

- Recordings from painful polyneuropathy patients (diabetes, Fabry, small fiber neuropathies, etc)
- N=30, 3 months time
- Example: “A Randomized, “Triple” Blind, Placebo-Controlled Study to Assess the Physchophysical and Electrophysiological Effects of XXXX in patients with Painful Diabetic Neuropathy”

Selected References

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Thank you