

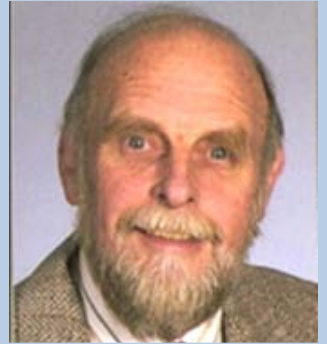
疼痛生理学講演会

Lectures on Pain Physiology

Monday, 9th, July, 2012

at 18:00

Barry Sessle



Lars Arendt-Nielsen

東京医科歯科大学 歯学部附属病院 4階

特別講堂

文京区湯島1-5-45
Tel 03-5803-5549

本講演は大学院特別講義(医歯学先端研究特論)(生命理工学先端研究特論)(医歯理工学先端研究特論)として行われます。

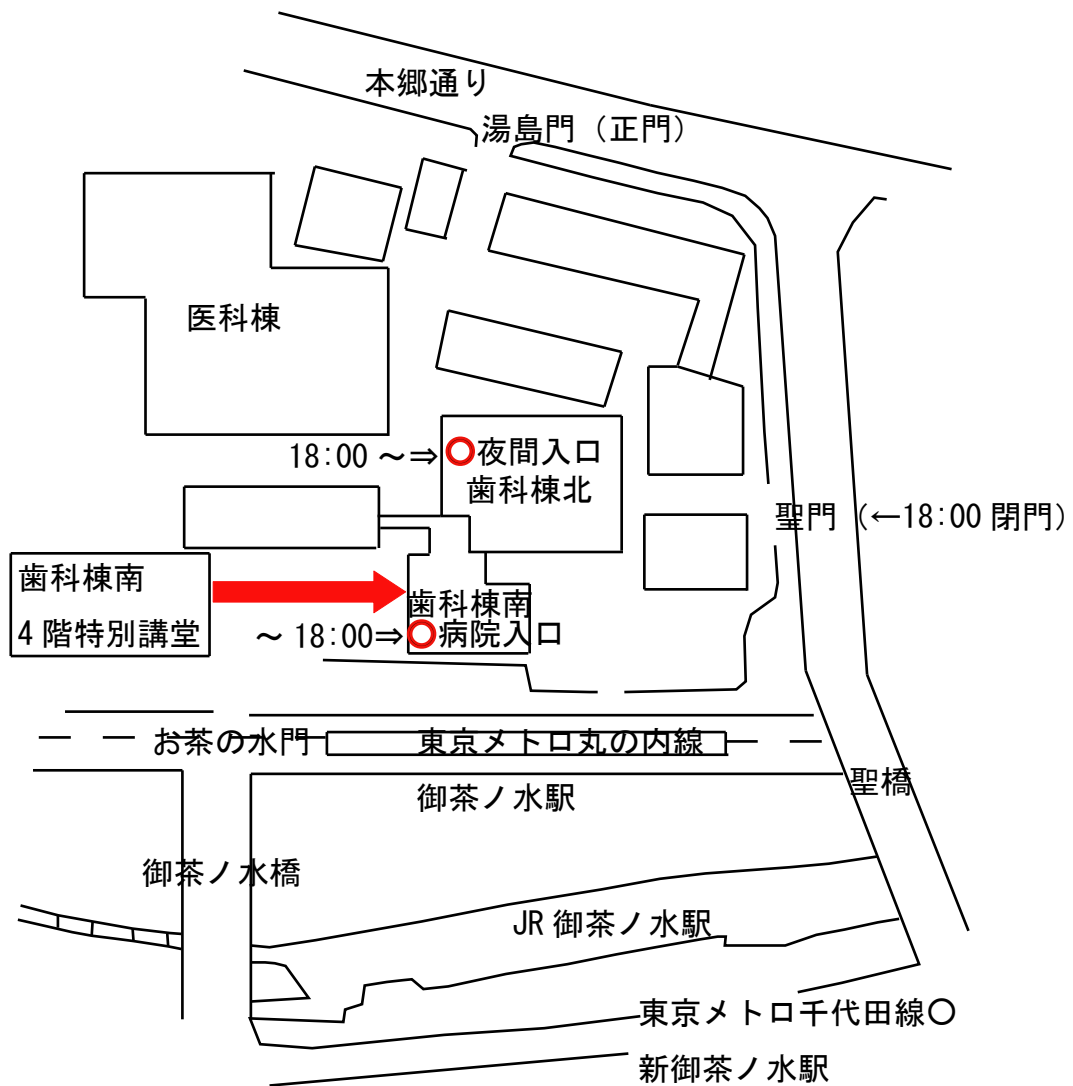
特別講演 18:00-

■ Animal Models of Orofacial Pain:
Insights into Mechanisms of Acute and
Chronic Orofacial Pain Conditions
(Prof. Barry Sessle, Faculty of Dentistry, University of
Toronto, Toronto, Canada)

■ Human Experimental Pain Research:
from Volunteers to Patients with Focus
on Orofacial Pain
(Prof. Lars Arendt-Nielsen, Center for Sensory-Motor
Interaction (SMI), Faculty of Medicine, Aalborg
University, Aalborg, Denmark)

世話人 (五十音順)

井関雅子(順天堂大学 医学部麻酔科学・ペインクリニック講座 先任准教授)
稲田英一(順天堂大学 医学部麻酔科学・ペインクリニック講座 主任教授)
今村佳樹(日本大学 歯学部口腔診断学講座 教授)
岩田幸一(日本大学 歯学部生理学講座 教授)
小野卓史(東京医科歯科大学大学院 咬合機能矯正学分野 教授)
加藤 実(日本大学 医学部麻酔科学系麻酔科学分野 准教授)
小長谷光(東京医科歯科大学大学院 麻酔・生体管理学分野 准教授)
嶋田昌彦(東京医科歯科大学大学院 疼痛制御学分野 教授)
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JR 総武線 中央線 御茶ノ水駅 お茶の水橋口 下車徒歩 3分
 東京メトロ丸の内線 御茶ノ水駅 下車徒歩 1分
 東京メトロ千代田線新御茶ノ水駅 下車徒歩 5分

Animal Models of Orofacial Pain: Insights into Mechanisms of Acute and Chronic Orofacial Pain Conditions

Barry J. Sessle, MDS, PhD, DSc (hc), FRSC, FCAHS
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This presentation will review the many recent advances in the understanding of orofacial pain mechanisms that have resulted from experimental studies in animal models of acute and chronic orofacial pain and that have implications for the improved diagnosis and management of orofacial pain.

In the past 4 decades, studies in animals have provided many details of orofacial nociceptors and their afferent inputs into the brainstem, revealing the vast array of ion channels, receptors, chemical mediators and non-neural factors involved in their activation, modulation and increased excitability (*“peripheral sensitization”*) following tissue injury or inflammation. This continues to be an important research area in view of its promise of identifying potential neural and non-neural targets for the development of new or improved peripherally based approaches to help manage orofacial pain. Much research in animal models of acute and more recently chronic orofacial pain has focussed on the brainstem regions receiving and relaying these nociceptive afferent inputs, and has documented the integral role that subnucleus caudalis (also termed the medullary dorsal horn) plays in central processing related to orofacial pain as well as the contributions of other brainstem regions. Some of the neural substrates in higher brain centres that underlie the sensory/discriminative, cognitive, and affective (emotional) /motivational dimensions of orofacial pain as well as related sensorimotor and other behavioural manifestations have been identified in animals, and correlated human studies have expanded the repertoire of sensory, motor and psychological measures of perceptual or behavioural responses in experimental and clinical orofacial pain. Also noteworthy has been the discovery of intrinsic brain pathways and some of their neurochemical, molecular and genetic substrates that can modulate orofacial nociceptive transmission and its behavioural or clinical expression. This includes *“central sensitization”* of trigeminal nociceptive brain pathways which occurs following tissue injury or inflammation and which depends on non-neural (eg, glial) as well as neural processes. Central sensitization appears to be a fundamental facilitatory process underlying increased pain sensitivity (hyperalgesia, allodynia) and pain spread, and the development and maintenance of chronic orofacial pain states.

Despite these new insights, the pathogenesis and especially the aetiology of several chronic orofacial pains and related conditions still remain an enigma, and still often present a diagnostic and management challenge to the clinician. In addition, the relative lack of awareness or appreciation of pain in general and its socioeconomic impact, and the poor knowledge base that many healthcare professionals have about pain, represent other challenges from the perspective of education and knowledge transfer. Nonetheless, emerging or improved technologies (eg, in imaging and sensory testing) and the application of current knowledge obtained from animal models about trigeminal nociceptive processes as well as new knowledge obtained about biological markers stemming from genetic and molecular biological approaches, hold out promise of improved clinical approaches to diagnose, manage and in some cases prevent orofacial pain conditions.

Human Experimental Pain Research: from Volunteers to Patients with Focus on Orofacial Pain

Lars Arendt-Nielsen, Prof, Director, Dr Med Sci, Ph D

Center for Sensory-Motor Interaction, School of Medicine, Aalborg University, Fredrik Bajersvej 7, D3, DK-9220 Aalborg E, Denmark, LAN@HST.AAU.DK, WWW.SMI.HST.AAU.DK

Human experimental pain research involves two separate topics: Standardised activation of the nociceptive system and quantitative assessment of the evoked responses. The ultimate goal of advanced human experimental pain research is to obtain a better understanding of mechanisms involved in pain transduction, transmission and perception under normal and pathophysiological conditions. Human experimental pain research bridges the gap between basic animal studies and clinical applications and provides better characterisation of pain mechanisms in healthy volunteers and characterise sensory dysfunction in patients with chronic pain, e.g. orofacial pain.

Experimental approaches can be applied in:

1. the laboratory for basic studies (e.g. peripheral and central hyperexcitability in the trigeminal region) for investigating pain mechanisms
2. the clinic to characterise patients with sensory dysfunctions and/or pain (e.g. TMD pain)
3. the clinic to monitor patients with sensory dysfunctions before and after treatment/surgery (e.g. orthognathic surgery).

The primary advantages of experimental approaches to assess pain sensitivity under normal and pathological conditions are:

- 1) Stimulus intensity, duration and modality are controlled and not varying over time.
- 2) Differentiated responses to different stimulus modalities and pain mechanisms.
- 3) The physiological and psychophysical responses can be assessed quantitatively and compared over time.
- 4) Pain sensitivity can be compared quantitatively between various normal/affected regions (e.g. trigeminal neuralgia).

As pain is a multi-dimensional perception it is obvious that the reaction to a single standardised stimulus of a given modality can only represent a very limited fraction of the entire pain experience. Therefore it is necessary to combine different stimulation and assessment approaches to gain advanced differentiated information about the nociceptive system under normal and pathophysiological conditions. This can be applied for phenotyping pain patient in order to optimise treatment and to follow the effect of management.