

Physical inactivity, sedentary lifestyle and obesity in the European Union

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Abstract of:

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Background: Diverging trends of decreasing energy intake and increasing prevalence of obesity suggest that physical inactivity and sedentary lifestyle may be one of the key determinants of the growing rates of overweight/obesity in Western populations information about the impact of physical inactivity and sedentary lifestyles on the prevalence of obesity among the general adult population in the European Union is sparse.

Objectives: To estimate the association of leisure-time sedentary and non-sedentary activities with body mass index (BMI, kg/m²) and with the prevalence of obesity (BMI > 30 kg/m²) in a sample of the 15 member states of the European Union.

Methods: Professional interviewers administered standardized in-home questionnaires to 15,239 men and women aged 15 years upwards, selected by a multi-stage stratified cluster sampling with quotas applied to ensure national and European representativeness. Energy expenditure during leisure time was calculated based on data on frequency of and amount of time participating in various physical activities, assigning metabolic equivalents (METs) to each activity. Sedentary lifestyle was

assessed by means of self-reported hours spent sitting down during leisure time. Multiple linear regression models with BMI as the dependent variable, and logistic regression models with obesity (BMI > 30 kg/m²) as the outcome, were fitted.

Results: Independent associations of leisure-time physical activity (inverse) and amount of time spent sitting down (direct) with BMI were found.

The adjusted prevalence odds ratio (OR) for obesity was 0.52 [95% confidence interval (CI): 0.43-0.64, P < 0.001] for the upper quintile of physical activity (> 30 METs) compared with the most physically inactive quintile (< 1.75 METs). A positive independent association was also evident for the time spent sitting down, with an adjusted OR = 1.61 (95% CI: 1.33-1.95, P < 0.001) for those who spent more than 35 h of their leisure time sitting down compared with those who spent less than 15 h.

Conclusions: Obesity and higher body weight are strongly associated with a sedentary lifestyle and lack of physical activity in the adult population of the European Union. These results, however, need to be interpreted with caution due to the cross-sectional design. Nonetheless, they are consistent with the view that a reduction in energy expenditure during leisure time may be the main determinant of the current epidemic of obesity.

Histomorphometric study of growth plate subjected to different mechanical conditions (compression, tension and neutralization). An experimental study in lambs

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We study the morphological effect of low, mechanical stresses (compression, tension and neutralization) on the growth cartilage with an external fixator in 18 young lambs. In the radiography we only found more length in the femora subjected to tension (p < 0.05).

Bony bridges were not present, nor were there signs of altered vascularization or Ranvier's perichondral ring. Histomorphometrically, in the group subjected to tension, the germinative layer in the femur was higher (p < 0.001) in the

bones which had undergone surgery. The proliferative layer were lower in the operated tibia (p < 0.001) and the hypertrophic layer were higher in operated tibias and femora (p < 0.001).

In the group subjected to compression, the germinative layer in the femora were higher in the operated bones (p < 0.05); the proliferative layer of the tibia was lower (p < 0.001) and the hypertrophic layer were higher (p < 0.001) in both operated bones.

In the neutralization group, the proliferative layer of both operated bones presented lower values (p < 0.001) and the hypertrophic layer was higher (p < 0.001) than the control groups.

Considerations upon the anatomical model of reward-based learning in the basal ganglia

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Summary

The nigrostriatal pathway appears to be very important in the reward-based learning. The dopaminergic neurons in the substantia nigra pars compacta (SNc) fire in relation to primary rewards and reward-conditioned stimuli, but not to rewards that are expected. It has been hypothesized that the anatomical

framework for the selective response of these neurons is organized in the projections from some paralimbic areas in the frontal lobe to the striosomes of the caudate nucleus, which are also directly connected with the dopaminergic neurons of the SNc. Here, we present two additional pathways that may be related with this neurophysiological finding. We hypothesize that the connections of the paralimbic cortices with the ventral system of the basal ganglia and then with the thalamus and the hypothalamus, and the circuit ventral striatum-substantia nigra pars reticulata-thalamus-striatum could be also involved in the reward-based learning.

Considerations on the thalamostriatal system with some functional implications

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The thalamostriatal projections are largely neglected in current reviews dealing with basal ganglia function. In the past few years, however, several studies have re-evaluated these projections and have postulated their implication in more complex tasks within the basal ganglia organization. In this review, we try to focus on the morphological and functional importance of this system in the basal ganglia of the rat, cat and monkey. Special attention is paid to the thalamus as an important place for interaction between the input and the output systems of the basal

ganglia through the thalamostriatal projections. Thus, we stress on the overlapping thalamic territories between the thalamic projection of the output nuclei of the basal ganglia and the thalamostriatal neurons. Our experimental data support the existence of several thalamic feedback circuits within the basal ganglia functional design. Finally, some considerations are provided upon the functional significance of these thalamic feedback circuits in the overall organization of the basal ganglia in health and disease.

Key words: Thalamostriatal projections. Basal ganglia. Thalamus. Rat. Cat. Monkey. Parkinson's disease.

Double Retrograde Tracer Study of the Corticostriatal Projections to the Cat Caudate Nucleus

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The distribution of corticostriatal neurons projecting to the caudate nucleus was examined in the cat by retrograde fluorescent tracers. Thus, Fast Blue and Diamidino Yellow were concomitantly injected in different rostrocaudal, dorsoventral, or medio-lateral sectors of the caudate nucleus. The main findings of this study are: 1. few double-labeled cells were found after two injections in different sectors of the caudate nucleus; 2. double-

labeled neurons were more abundant after adjacent injections and they were mainly located in 6 $\alpha\beta$, dorsolateral prefrontal, dorsomedial prefrontal, prelimbic, anterior limbic, sylvian anterior, and rostral part of cingulate cortical areas; and 3. there were variations in the spatial organization of the corticostriatal neurons in different cortical areas projecting to various parts of the caudate nucleus.

Key words: Striatum. Caudate nucleus. Cerebral cortex. Basal ganglia. Fluorescent tracers. Corticostriatal projections. Cat.

Thalamic distribution of zinc-rich terminal fields and Neurons of origin in the rat

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Several cortico-cortical and limbic-related circuits are enriched in zinc, which is considered as an important modulator of glutamatergic transmission. While heavy metals have been detected in the thalamus, the specific presence of zinc has not been examined in this region. We have used two highly sensitive variations of the Timm method to study the zinc-rich innervation in the rat thalamus, which was compared to the distribution of acetylcholinesterase activity. The origin of some of these zinc-rich projections was also investigated by means of retrograde transport after intracerebral infusions of sodium selenium (Na₂SeO₃). The overall zinc staining in the thalamus was much lower than in the neocortex, striatum or basal forebrain; however, densely stained terminal fields were observed in the dorsal tip of the reticular thalamic nucleus, the anterodorsal and later-

al dorsal thalamic nuclei and the zona incerta. In addition, moderately stained zinc-rich terminal fields were found in the rostral intralaminar nuclei, nucleus reuniens and lateral habenula. Intracerebral infusions of Na₂SeO₃ in the lateral dorsal nucleus resulted in retrogradely labeled neurons that were located in the postsubiculum, and also in the pre- and parasubiculum. These results are the first to establish the existence of a zinc-rich subicular-thalamic projection. Similar infusions in either the intralaminar nuclei or the zona incerta resulted in labeling of neurons in several brainstem structures related to the reticular formation. Our results provide morphological evidence for zinc modulation of glutamatergic inputs to highly selective thalamic nuclei, arising differentially from either cortical limbic areas or from brainstem ascending activation systems.

Key words: Acetylcholinesterase. Chemoarchitecture. Glutamate. Thalamus. Limbic system. Reticular formation.

Therapeutic embolisation for postoperative haemorrhage after total arthroplasty of the hip and knee

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We describe three cases of postoperative haemorrhage, two after total hip and one after total knee replacement, treated by percutaneous embolisation. After diagnostic angiogra-

phy, this is the preferred method for the treatment of postoperative haemorrhage due to the formation of a false aneurysm, after hip or knee arthroplasty. This procedure, carried out under local anaesthesia, has a low rate of complications and avoids the uncertainty of further surgical exploration.

Striatal input from the ventrobasal complex of the rat thalamus

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We have analyzed whether caudal regions of the caudate putamen receive direct projections from thalamic sensory relay nuclei such as the ventrobasal complex. To this aim, the delivery of the retrograde neuroanatomical tracer Fluoro-Gold into the caudal caudate putamen resulted in the appearance of retrogradely labeled neurons in the ventral posteromedial and ventral posterolateral thalamic nuclei. These projections were further confirmed with injections of the anterograde tracers biotinylated

dextran amine or Phaseolus vulgaris leucoagglutinin into these thalamic nuclei, by showing the existence of axonal terminal fields located in the caudal striatum. These results support the existence of direct projections linking the thalamic ventrobasal complex and the caudal striatum in the rat, probably via collateralization of thalamocortical axons when passing through the caudate putamen, and therefore supporting the putative involvement of the caudal striatum in sensory-related functions.

Key words: Basal ganglia. Striatum. Caudate putamen. Thalamostriatal projections. Neuroanatomical tracers.

Femoral Anteversion Osteotomy for the Treatment of Hip Dislocation in Down Syndrome: Long-Term Evolution

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We propose a femoral desrotational osteotomy to antevert the femoral head associated with plication of the anterior and superior capsule for treatment in the early stages of hip dislocation in Down syndrome. Eight patients (10 hips) with Down syndrome and hip dislocation were reviewed. Five children (seven hips) were operated. We used the proposed surgical technique

in three patients (four hips). The average follow-up was 11 years (range, 5-16 years). No infections or complications were observed. In our short experience, this is the recommended procedure in the early stages of hip dislocation in Down syndrome.

Key Words: Down syndrome. Trisomy 21. Hip dislocation. Surgical treatment.

Allergen-induced basophil activation: CD63 cell expression detected by flow cytometry in patients allergic to Dermatophagoides pteronyssinus and Lolium perenne

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Background: In this study, we determined by flow cytometry the percentage of basophils activated after in vitro stimulation by allergens and expressing the CD63 marker. The diagnostic reliability of the technique was assessed as well as its correlation with other in vitro diagnostic parameters.

Methods: Fifty-three patients suffering from asthma and/or allergic rhinitis following sensitization to Dermatophagoides pteronyssinus and 51 patients sensitized to Lolium perenne were investigated. Twenty-four atopic patients not sensitive to these allergens and 38 healthy subjects were also selected as controls. The basophil activation test determines the percentage of basophils which express CD63 as an activation marker, by means of flow cytometry, after in vitro stimulation with allergen, using double labelling with monoclonal antibody anti-CD63-PE and anti-IgE-FITC.

Results: No differences in basal values (non-activated control) were found between sensitized patients, atopic controls and healthy controls. On the other hand, sensitized patients showed a significantly higher percentage of activated basophils after stimulation by allergens in vitro than both control groups ($P < 0.001$). We found a significant correlation between skin tests and basophil activation tests ($r = 0.72$, $P < 0.001$). We also found a positive and significant correlation between basophil activation tests and histamine release tests ($r = 0.80$, $P < 0.001$), allergen-specific sulphidoleukotriene production ($r = 0.7$, $P < 0.001$) and the occurrence of serum allergen-specific IgE ($r = 0.71$, $P < 0.001$).

Conclusion: The basophil activation test is a highly reliable technique in the diagnosis of allergy to inhalant allergens. The sensitivity of the basophil activation test was 93.3%, and its specificity 98.4% when using a cut-off point of 15% activated basophils as positive result.

Key words: Basophil activation test. CD63. Inhalant allergens. In vitro allergologic diagnosis.