

METAL IONS AND OXIDATIVE STRESS IN NEUROLOGICAL DISEASES

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Preface

A characterizing feature in neurodegenerative pathologies is their multi-factorial etiology associated with aging, biological susceptibility and environmental factors. Recently, it has been suggested that some chemical elements play a role in the arising of neurodegenerative phenomena. In normal physiological situations homeostatic mechanisms, the brain blood barrier and the energy required for metal transport can interplay as efficient defence systems. In neurodegenerative disorders alterations of the brain blood barrier together with energy compromises could allow an abnormal movement of metals in the brain compartments. Cytotoxic effects can arise from disturbances in metal homeostasis, most likely as result of their involvement in oxidative damage processes. In this context, a better and a full comprehension of the role of chemical elements in neurodegenerative disorders is increasingly required. In this monograph of *Annali* a noteworthy and updated overview by L. M. Sayre and colleagues reports on the involvement of metals and oxidative stress in neurodegenerations such as Alzheimer's and Parkinson's diseases and in the demyelinating disease multiple sclerosis. Follows, a series of papers dealing with the results of researches focused on the metal monitoring in biological fluids of Alzheimer's, Parkinson's and multiple sclerosis patients. These contributions show how a multi-disciplinary approach, from analytical chemistry, to the biomonitoring, neurology, epidemiology and toxicology fields, can be useful, if not mandatory, to highlight aspects about interaction between biological and environmental factors in the neuropathogenesis. In the paper by B. Bocca *et al.* the development of analytical methodologies is reported, whilst in that one by S. Costantini *et al.* a proficiency test carried out to optimize the performances of the Italian chemical laboratories network is described. A. Alimonti *et al.* present the reference values of the chemical elements under study, obtained from a healthy urban population utilized as control group *vs* patients. The contribution of G. Forte *et al.* examines the level of metals and of oxidative stress in the peripheral fluids of Parkinson's patients. Analogously, the two next papers, by B. Bocca *et al.* and by G. Bomboi *et al.*, discuss the metal body concentrations and clinical aspects in subjects affected by Alzheimer's disease. G. Forte *et al.* and A. Visconti present a detailed examination on the blood elements imbalances and data relating to a six-month follow-up study on groups of multiple sclerosis' patients. Finally, the last contribution of A. Pino *et al.* shows the capability of statistical multivariate tests to elucidate the possible sets of variables able to discriminate between pathological and healthy subjects.

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