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Bollettino della Società Italiana di Biologia Sperimentale



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most common genetic cause of Parkinson's disease (PD). The LRRK2 physiological and pathological function is still debated. However different experimental evidence based on LRRK2 cellular localization and LRRK2 protein interactors suggest that LRRK2 may be part and regulate a protein network modulating vesicle dynamics/trafficking. Interestingly the synaptic vesicle protein SV2A is part of this protein complex. Importantly, SV2A is the binding site of the Levetiracetam (LEV) a compound largely used in human therapy for epilepsy treatment. The binding of LEV to SV2A reduces the neuronal firing by the modulation of vesicle trafficking although by an unclear molecular mechanism. We have analyzed the interaction between the LRRK2 and SV2A pathways by LEV treatment. Interestingly LEV significantly counteracts the effect of LRRK2 G2019S pathological mutant expression in three different cellular experimental models. LEV rescues the negative effect of LRRK2 pathological mutant expression in the differentiation of primary neurons or PC12 cells. Moreover LEV rescues the effect of LRRK2 pathological mutant expression on dopamine receptor D2 (DRD2) localization/trafficking. Our data strongly suggest that LEV treatment may have a neuroprotective effect on LRRK2 pathological mutant toxicity and that LEV repositioning could be a viable compound for PD treatment.

PLASTIC OCCURRENCE IN *PELAGIA NOCTILUCA* FROM THE STRAIT OF MESSINA

Serena Savoca¹, Marco Albano^{1*}, Giuseppe Panarello¹, Gioele Capillo¹, Antonella Granata¹, Letterio Guglielmo⁴, Giovanna D'Angelo², Caterina Branca², Teresa Bottari^{3,4}, Monique Mancuso^{3,4}, Nunziacarla Spanò⁵

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The number of studies showing the impact of microplastics (MPs) on marine organisms is constantly increasing. It is now known that, due to the small size, microplastics can be ingested by a wide range of organisms, such as zooplankton, invertebrates and fish. However, the occurrence of MPs in cnidarians is still little explored. The present study aims to assess their occurrence in the mauve stinger *Pelagia noctiluca*, collected from the Strait of Messina. In total 49 samples were examined. The specimens were divided into 4 pools based on their size; umbrella and oral arms were examined separately. Microplastic extraction was carried using a chemical digestion. After digestion, the membranes were observed under stereomicroscope and MPs were visually identified and cataloged on the basis of shape, size and color. A total of 55 MPs in fibrous shape were found (44 black, 8 blue, 1 red, 1 light blue and 1 white). 62% of the microplastics were extracted from the umbrella, while 38% from the oral arms. Micro Raman and infrared spectroscopy were applied for the MPs identification. *Pelagia noctiluca* is the most abundant jellyfish species in the Mediterranean sea with a significant ecological importance. Our results confirm the ability of this species to uptake plastic particles, probably related to feeding behaviour. Therefore, this preliminary

study suggest the potential use of this species as a sentinel organism for microplastic pollution.

TDP-43 PHYSIOPATHOLOGY AND CYANOTOXINS EXPOSURE

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Amyotrophic Lateral Sclerosis (ALS) is an adult-onset neurodegenerative disease, characterized by the progressive degeneration of upper and lower motor neurons. More than 20 ALS-causing genes, responsible for 10% of cases, were identified. In Sardinia, that represent a genetic isolate characterized by a higher frequency than expected of the rate of fALS (familial ALS), a high rate (about 30%) of TDP-43 A382T missense mutation has been reported. Environmental triggers may be involved in disease initiation and chronic exposure to the cyanotoxins L-BMAA it has been demonstrated to have a role in multiple neurodegenerative diseases including ALS. Cyanobacteria are ancient and photosynthetic ubiquitous microorganisms, able to cause Harmful Algal Blooms, especially in freshwater ecosystems. The interest in investigating the exposure to this non-protein amino acid as possible risk factors, particularly on vulnerable subpopulations of motor neurons, has significantly increased. The main objectives of our work are study the effects of cellular extracts of Cyanobacteria isolated from Sardinian lakes and reservoirs or purified L-BMAA, on cellular models of ALS focusing on models carrying TDP43-A382T mutation and investigate the effects of the exposure, via oral intake, to chronic BMAA on *Drosophila* models for ALS. At present we set up both cellular and *Drosophila* ALS models. Using neuronal SH-SY5Y cells expressing WT or pathological TDP-43 mutants, we investigated TDP-43 subcellular localization, cell viability and physiology through the analysis of different cell parameters, upon stimulation with different doses of BMAA.

A NEW METHOD TO MEASURE REACTIVE OXYGEN SPECIES IN ERYTHROCYTE SYSTEM

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Reactive oxygen species (ROS) are common by-products of normal aerobic cellular metabolism and play important physiological roles in intracellular cell signaling and homeostasis. Excessive amounts of ROS generate oxidative stress (OS), compromising cell health and contributing to disease development. Red blood cells (RBCs) are highly susceptible to oxidative damage due to the high cellular oxygen concentration and hemoglobin, a powerful promoter of the oxidative process. Biomarkers of OS can therefore be exploited as important tools in the assessment of disease status in humans and understanding ROS-dependent biochemical pathways. Several approaches such as fluorescence by