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Abstracts
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that following 48 hours, PS2 deficient mice showed a reduction in microglia activation as well as a reduction in clearance of A β compared to WT mice. In conclusion, in this work we suggest the important role of presenelin 1 and 2 in microglia cell activation.

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Bio-inspired motion control for pedundulatory robotic locomotion

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Drawing inspiration from biology, where the relationship between organism morphology and the control of movement has been effectively addressed by the evolutionary process, can help in designing efficient and agile robots, able to adapt robustly to a variety of environmental conditions in unstructured substrates. Our work focuses on robotic systems inspired by the morphology and locomotion of the polychaete annelid marine worms and of the centipede arthropods, which combine body undulations with the action of numerous lateral appendages, to propel themselves efficiently on sand, mud, sediment, as well as underwater. This type of locomotion has been termed pedundulatory. Computational models, for the mechanics and motion control of such systems, are based on the Lagrangian dynamics of the system and on resistive models of its frictional interaction with the substrate. Computational tools were developed to assist modelling, as well as robot and control design. The generation of open-loop pedundulatory gaits, both by the direct actuation of the system's degrees-of-freedom and by actuation schemes inspired by the neuromuscular control of living organisms was studied, involving the use of direct or retrograde body waves, as well as the appropriately synchronized movement of the lateral appendages. The corresponding modes of locomotion were investigated, and comparatively assessed, via extensive experiments on granular (as well as on other unstructured) substrates, which validate the proposed models and highlight the performance of pedundulatory robots. These models are exploited to the design of bio-inspired closed-loop control schemes, which, in combination with appropriate sensory information, give rise to reactive behaviours like corridor following and swarming. *Supported in part by the European union, through the R&D projects BIOLOCH, VECTOR and OCTOPUS.*

Chromatic Vasarely effect

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Vasarely's 'nested-squares' illusion is a perceived glowing X along the diagonals of concentric squares with luminance gradient. We present here that in a novel chromatic Vasarely effect where the concentric squares have saturation gradient, under iso-brightness conditions, the X is perceived with complementary color to the color of the nested-squares (or angles). The experimental results show that a large repertoire of stimuli with different colors and angles yielded significant perceived colors. The results show that the strength of the perceived illusory fold (of both the length and the saturation) is significantly larger at sharper angles of the stimuli. The chromatic first-order adaptation computational model predicts most of the above results.

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Inhibition of the proteasome Bi-directionally affect learning & memory process in the cortex

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Learning and memory are often regarded as two different processes. whereas, in learning we acquire new information about the world, memory is the internal representation of this knowledge. Memory can be divided into two temporal phases: short term memory and long term memory. Numerous work in different species and brain structures demonstrated that long but not short term memory is sensitive to protein synthesis inhibitors, thus, long term memory is dependent on cellular protein levels. At the same time very little is known about the other side of the process, namely, protein degradation and its effect on learning or memory processes. Here we tested the effect of local inhibition of the proteasome in the gustatory cortex (GC) on taste learning. We found that proteasome inhibitors improve learning when they are introduced before taste learning (n=26, F1, 24=4.9, p<0.05). However, the same inhibitors attenuated taste memory when microinjected at different time intervals following learning (n=38, F1.2, 44.4=42.2, p<0.05). In agreement with previous publications, application of protein synthesis inhibitor attenuated long term memory, However, co-application of proteasome and synthesis inhibitors, had no effect on taste memory (p=1). These results demonstrate for the first time that in a similar way to synaptic plasticity, steady state expression of protein/s enables memory consolidation and suggest that proteasomal regulation may operate a bi-directional mechanism affecting both the creation and stabilization of memories.

Cognitive behavior prediction and induced plasticity using diffusion tensor imaging (DTI)

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