full-field binoculars and immunohistochemical were the two main methods used for functional and histological study.

**Results:** The electroretinographic and histological results obtained shows that calcium antagonists (Nifedipine, Diltiazem) have no neuroprotective effect on the damaged retina after intraocular administration of NMDA 30 mM / KA 10 mM, however, Brimonidine seems to have a neuroprotective effect after induction of the damage at concentrations of NMDA 3 mM / KA 1 mM.

**Conclusions:** The intraocular injection of high doses of glutamate agonists NMDA30mM / KA10mM causes a total loss of visual function and this damage cannot be inhibited by calcium antagonists. However, the lower NMDA3mM / KA1mM intraocular injection dose induced less structural and functional damage in the retina and this damage can be inhibited by topical administration of Brimonidine and therefore delaying the loss of visual function.

Neurodegeneration, excitotoxicity, neuroprotective, Brimonidine, calcium antagonist, electroretinogram

**P1-02**

**GALR2/NPYY1R HETERODIMERS INTERACT AT RECEPTOR LEVEL IN THE DENTATE GYRUS OF THE HIPPOCAMPUS IN RATS**

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Previously, we have described Galanin(GAL) and Neuropeptide Y (NPYY)1 interactions at behavioural, cellular and receptor levels through GAL/NPY1R heterodimers in the amygdala. The aim of this work was to study GAL/NPY1R interactions in the Dentate Gyrus (DG) of the Hippocampus, using autoradiographic, in situ hybridization and in situ proximity ligation assay (PLA).

Rats (n = 6) were sacrificed 15 min or 5 h after icv injections of GAL (3 nmol) and DG sections were incubated with NPYY1R agonist [125I]-[Leu1,Pro2,3]NPYY (25 pm) or NPYY1R-3PdATP specific probe, for autoradiography and in situ hybridization respectively. Autoradiograms were analyzed using NIH image analysis system and Student’s unpaired t-test was used. For PLA, DG sections were incubated with anti-GALR2 Rabbit (1:100) and anti-NPYY1R Goat (1:200). PLA signals were detected with PLA PLUS or MINUS probes for rabbit or goat/mouse antibodies. PLA signals were visualized by using a confocal microscope Leica TCS-SL confocal microscope (Leica).

We observed that GAL significant increased the NPYY1R agonist [125I]-[Leu1,Pro2,3]NPYY binding in the DG by 20% (p < 0.05) and the NPYY1R mRNA expression in the granular layer of DG by 31% (p < 0.001). Moreover, PLA-positive red clusters were found specifically in the polymorphic layer and subgranular zone of the DG. No PLA clusters were observed neither in the molecular layer of the DG nor in the corpus callosum, an area that seems to lack of GALR2 receptor. These results demonstrate a novel mechanism of interaction between GAL and NPYY1R in the DG at receptor level, probably involving the formation of GALR2/NPYY1R heteroreceptor complexes. Study supported by Junta de Andalucía CVI6476.

Galanin Receptor 2, Neuropeptide Y Receptor 1, heterodimers, Hippocampus, depression

**P1-03**

**INFLAMMASOME MARKERS IN THE SKELETAL MUSCLE OF AN AMYOTROPHIC LATERAL SCLEROSIS MOUSE MODEL**

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Amyotrophic Lateral Sclerosis (ALS) is a neurodegenerative disease characterized by the atrophy and paralysis of voluntary muscles as consequence of the progressive loss of both upper and lower motor neurons. Nowadays, its etiopathogeny still remains unknown although a wide range of mechanisms that could explain this selective vulnerability of motoneurons has been proposed (oxidative stress, mitochondrial dysfunction, excitotoxicity), among which the neuroinflammation has a great relevance.

Neuroinflammation is mediated by cytosolic protein complexes known as inflammasomes, which act as intracellular sensors for infectious agents as well as for danger signals associated with neurological diseases. The best characterized is the NLRP3 inflammasome and it comprises the NLR protein NLRP3, the adaptor ASC and pro-caspase 1. After its assembly caspase-1 is activated, which then cleaves the precursor forms of pro-inflammatory cytokines IL-1β and IL-18 into their active forms. These cytokines, once activated and secreted, promote innate immune processes associated with infection, inflammation and autoimmunity, playing an important role in the onset of neuroinflammation and subsequent occurrence of neurodegenerative diseases, cognitive impairment and dementia. It has been observed that the NLRP3 inflammasome is implicated in numerous infectious and sterile inflammatory diseases. However, it has not been studied in depth its possible role in ALS and in particular, in a tissue such as skeletal muscle yet. For this reason, our main objective was the study of the NLRP3 inflammasome in skeletal muscle of transgenic animals SOD1G93A, a mouse model of ALS, to evaluate its involvement in the disease progression.

To achieve this objective, gene expression of the key molecular effectors of inflammasome (NLRP3, ASC, caspase-1 and IL-1β) was assayed by real-time PCR in both B6SJL wild type and
SOD1G93A mutant mice at the main stages of the disease, in order to study their potential role along disease progression in the animals. Two-tailed t-Student tests were used to assess statistical significance between groups.

Our findings showed deregulated levels of studied markers, mainly at the symptomatic stage of the disease, suggesting that the NLRP3 inflammasome can be involved in the pathogenesis of ALS. In particular, high expression level of pro-inflammatory interleukins like IL-1β, mediated by the NLRP3 inflammasome activation, could promote an inflammatory response in this animal model.

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Neuroinflammation, Amyotrophic Lateral Sclerosis, SOD1(G93A), NLRP3 inflammasome

P1-04
P11 MODULATES INTRINSIC EXCITABILITY AND VULNERABILITY TO EXCITOTOXIC STIMULI OF MOTONEURONS IN A MOUSE MODEL OF AMYOTROPHIC LATERAL SCLEROSIS (ALS)

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Increase of intrinsic excitability (increased membrane resistance (Rm) and membrane potential (Vm) depolarization) in neurons might exacerbate intracellular Ca2+ mobilization triggered by excitatory neurotransmitters and lead to loss on neuronal function and subsequent death. Glutamate (Glut)-induced excitotoxicity is a major pathogenic mechanism involved in motor neuron (MN) degeneration at several motor pathologies. Thus, understanding molecular mechanisms involved in the regulation of intrinsic excitability of MNs has a basic and clinical interest. In this line, p11, a retention factor in reticulum endoplasmic for TASK1 (leak K+ channels), could be a key regulator of excitability and hypersensibilization against excitotoxic stimuli of MNs. Pretreatment of primary cultures of embryonic spinal MNs (SMNs) with an small interfering RNA against mRNA for p11 (siRNAp11), induced both, a reduction in intrinsic excitability of SMNs (Rm decrease, Vm hyperpolarization) and an increase in survival of SMNs exposed to an excitotoxic stimulus (Glut 150 μM, 30 min) relative to control RNA (cRNA). These effects were TASK1-dependent (absent in SMNs from task1−/−). p11 up-regulation and TASK1 subunits down-regulation were observed in the spinal cord extracted from the ALS mouse model SOD1(G93A):p11 deregulation was also observed in SMNsSOD1(G93A), siRNAp11 attenuated hyperexcitability observed in SMNsSOD1(G93A) and reduced vulnerability against Glut. By means of imaging procedures, it was observed that siRNAp11 reduced basal [Ca2+]i increase triggered by Glut and delayed Glut-induced [Ca2+]i deregulation in SMNs and SMNsSOD1(G93A) in a TASK1-dependent manner. Chronic administration of siRNAp11 to pre-symptomatic SOD1(G93A) mice delayed motor deficits onset, increased the number of surviving MNs in the sacro-lumbar segment, and increased their life span. Altogether these outcomes indicate a pivotal role of p11 in the regulation of neuronal excitability via TASK1 subunits, then modulating [Ca2+]i dynamics. The neuroprotective effect observed of reducing p11 levels, which was TASK1-dependent, suggests that such as TASK1 openers as modulators of p11 expression could be potentially interesting therapeutic strategies in the treatment of several MNs pathologies.


Motoneurons, excitotoxicity, excitability, TASK channels, p11

P1-05
MULTIMEDIA: A USEFUL TOOL FOR IMPROVING THE LEARNING OF PHYSIOLOGY

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Introduction: Teaching in Physiology is delivery through thematic units to improve the learning of different topics, but we found that most of the students have difficulties to connect units together and get an overview of the subject. Given the importance of the integration of physiological processes, we believe that methods that allow students to interrelate the functions of different physiological systems help to enhance learning of physiology.

Objectives: The main goal of our project was to integrate two major thematic units of human physiology, the cardiovascular and endocrine system, by developing multimedia material. The material was developed as a research project, with the additional objective to introduce students to scientific method.

Methodology: The development of the multimedia material was supported by the grant “Projectes Innovació Educativa 2015–2016, University of Valencia”. At the beginning of the activity we proposed a working hypothesis. The students had to evaluate if the hormonal changes during the menstrual cycle could modify the values of blood flow and their impact on regulatory mechanisms. In order to test this hypothesis, blood flow in the forearm was indirectly measured by venous occlusion plethysmography.

Results: The multimedia material is available to students on: http://mmedia.uv.es/html5/g/cream//45327_pletismografia_cas.mp4. It is divided in three parts; the first one contains an introduction to menstrual cycle and the relationship between estrogen and endothelium, the hypothesis and the experimental design protocol. The second part shows the use of the