

## **Nicotinic modulation of glutamate receptor function at nerve terminal level: fine tuning of synaptic signals**

M. Marchi<sup>1,2</sup>, M.C. Padolecchia<sup>1</sup>, G. Olivero<sup>1</sup>, C. Jiayang<sup>1</sup>, M. Grilli<sup>1</sup>, A. Pittaluga<sup>1,2</sup>

<sup>1</sup>Dept. of Pharmacy, Pharmacology and Toxicology Section, University of Genoa, Italy

<sup>2</sup>Center of Excellence for Biomedical Research, University of Genoa, Italy

This presentation is focuses on the functional interaction which occurs between some nicotinic cholinergic receptors (nAChRs) and specific glutamatergic receptor subtypes present at the nerve endings level and which modulate the release of different neurotransmitters in the rat nucleus accumbens. We report data obtained using synaptosomes in superfusion, supplemented and integrated with results achieved using molecular biology and immuno-cytochemistry approaches. Alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) and N-methyl-D-aspartate (NMDA) glutamatergic receptors are co-localized with nAChRs on the same nerve endings and this colocalization originates a synergistic or an antagonistic interaction among them. The neurotransmitter release elicited by the activation of some AMPA and NMDA receptors can be negatively or positively modulated in response to a brief incubation with nicotine or with other nAChR agonists . This effect occurs in the course of few minutes and requires the involvement of the trafficking of AMPA and NMDA receptors. This event takes place also at concentrations of nicotine comparable with those present in the blood of the smokers and involves the activation of several nAChRs subtypes. This dynamic control of the glutamatergic receptors function may therefore represent an important presynaptic adaptation following the administration of nicotine.