

Abstract 45

GDI1 KO MICE SHOW A PRESYNAPTIC DEFICIT AT CORTICO-LATERAL AMYGDALA SYNAPSES

Patrizia D'Adamo¹, Veronica Bianchi¹, Frédéric Gambino², Yann Humeau² and Daniela Toniolo³.

Dulbecco Telethon Institute, Dibit - San Raffaele Scientific Institute, Milano, Italy¹.

Centre National de la Recherche Scientifique, Institut des Neurosciences Cellulaires et Intégratives, Strasbourg, France².

Dibit - San Raffaele Scientific Institute, Milano, Italy³.

Mental retardation (MR) is a common disorder affecting about 2% of the human population. Null mutations of *alfaGDI*, a protein controlling the functional cycling of Rab proteins cause Mental Retardation in humans. Mutant mice carrying a deletion the *Gdi1* gene were viable and fertile and did not present visible morphological or neuro-pathological. However, the lack of *alfaGDI* in mice impaired hippocampus dependent short-term memory formation and greatly reduced mouse male aggression, thereby modifying their social interaction. We reported that *Gdi1* KO hippocampal synapses present a large decrease in the reserve pool (RP) of SVs resulting in a slow SV recovery after SV depletion, and which may cause the hippocampus dependent short-term memory deficit in *Gdi1* KO mice. Altogether, these data lead to investigate if modification of synaptic properties and/or plasticity at different synaptic connections in the emotional-related brain structures, such as the amygdaloid nucleus, may have a role in the fear-related and overfriendly behaviour observed in the mutant mice. It has been reported that glutamatergic cortical projections to the LA contribute to the emotional learning, providing qualitative information in addition to the highly responsive sub-cortical pathway. Here, we examined Cortico-LA synaptic physiology in the absence of *alfaGDI*, and report a strong reduction in the overall synaptic weight at these synaptic contacts. This was associated with alterations of pre- but not postsynaptic synaptic parameters and suggests specific alterations in the refilling rate of release sites. The examination of animals bearing delayed and specific *alfaGDI* mutations, reproduce emotional-related behavioral deficits but displaying additional synaptic phenotypes allowed us to propose the existence of compensatory mechanisms during early development.