## P1.19.

# Characterization of electrical coupling between cerebellar Golgi cells

Lorincz, A.[1*]; Vervaeke, K.[2]; Silver, R. A.[2]; Nusser, Z.[1]

*1: Institute of Experimental Medicine, Hungarian Academy of Sciences, Budapest,*
*2: University College London, London, United Kingdom*

Properties of chemical synaptic neurotransmission have been extensively studied and well characterized in many neuronal types, however little is known about factors determining the amplitude and time course of electrical synaptic potentials. Here we performed paired whole-cell recordings between cerebellar Golgi cells (GCs), cells that are exclusively interconnected by gap junctions (GJs), and correlated light- and electron microscopy of the recorded pairs to determine the number and location of electrical synapses. In addition, SDS-digested freeze-fracture replica-labelling (SDS-FRL) was performed to identify the size of GJs and their connexon content. The strength of electrical coupling varied between GC pairs. Strongly coupled GCs were interconnected by 6-9 proximal dendritic GJs, whereas weaker coupling was mediated by fewer (2-3) and more distally located GJs. Connexin36 was necessary for functional electrical coupling between GCs. Double immunofluorescent and SDS-FRL reactions revealed that the mean size of connexin36 immunopositive GJs on mGluR2 positive GC dendrites was 0.026 μm2 with substantial variability (coefficient of variation = 0.68). Within GJs the mean density of connexons was ~13000 per μm2. These parameters will be incorporated in realistic models of electrically coupled GCs in order to determine the degree of dendritic and gap junctional attenuation of action potentials.