

Role of intracellular trafficking of AMPAR during LTP

Caroline Bonnet, Valeria Pecoraro, Justine Charpentier, Daniel Choquet,

Françoise Coussen-Choquet

▶ To cite this version:

Caroline Bonnet, Valeria Pecoraro, Justine Charpentier, Daniel Choquet, Françoise Coussen-Choquet. Role of intracellular trafficking of AMPAR during LTP. EMBO workshop: Molecular Neurobiology, May 2022, Heraklion, Greece. hal-03822656

HAL Id: hal-03822656 https://hal.science/hal-03822656

Submitted on 3 Nov 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Role of intracellular trafficking of AMPAR during LTP

Bonnet, C.^{1,2}, Pecoraro, V.^{1,2}, Charpentier, J.^{1,2}, Choquet, D.^{1,2,3} & <u>Coussen, F.^{1,2}</u> ¹University of Bordeaux, 33000 Bordeaux, France; ²CNRS, Interdisciplinary Institute for Neuroscience, UMR-5297, 33000 Bordeaux, France; ³Bordeaux Imaging Center, UMS-3420, US4-INSERM, University of Bordeaux, 33000 Bordeaux, France



erc

Introduction

de **BORDEAUX**

Abundance of AMPA receptors (AMPAR) at synapse is essential for the establishment and maintenance of synaptic function. Their synaptic localization is dependent on a highly dynamic exocytosis, endocytosis and plasma membrane mobility events.

Using our new biochemical tool combined with photonic live imaging, we controlled and followed the intracellular transport of tagged GluA1 containing receptors in cultured rat hippocampal neurons. Analyzes are performed for GluA1 WT and mutants of GluA1 C-terminus domain in basal condition and during LTP. In organotypic hippocampal slices we combine imaging and electrophysiology experiments to analyze the impact of intracellular transport of AMPAR on LTP.

Localization of AMPAR is regulated by their intracellular trafficking thru interaction of their C-terminus domains with different intracellular partners. These interactions play a major rule in the exocytosis and localization of the receptor at the plasma membrane both in basal condition of during cLTP. In hippocampal slice intracellular transport of AMPAR plays a major role during LTP.



Role of the interaction between 4.1N and the C-terminal domain of GluA1 in the intracellular transport of GluA1 during basal transmission and LTP

GluA1 C-term. domain and IT

4.1N and GluA1 IT

Binding GluA1 / 4.1N and GluA1 IT





Externalization

+Scr

+sh

∆78









....

sh









LTP

BASAL

Externalization





Transport

AA

ш





150 ·

120

90

WΤ

21

0.5









Role of neo-synthetized GluA1 in the induction and maintenance of LTP in hippocampal slices



«Old» mobile receptor

«Old» trap receptor

Neo-synthetized receptor

RE: recycling endosomes

Dual Patch-Recording, LTP