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Uncoupling of Molecular Maturation from Peripheral Target Innervation in Nociceptors Expressing a Chimeric TrkA/TrkC receptor

Svetlana Gorokhova, [1] Stéphane Gaillard, [1] Louise Urien, [1] Pascale Malapert, [1] Wassim Legha, [1] Grégory Baronian, [2] Jean-Pierre Desvignes, [2] Serge Alonso, [1] and Aziz Moqrich

1. Aix-Marseille-Université, CNRS, Institut de Biologie du Développement de Marseille, UMR 7288, Marseille, France
2. MGX-Montpellier GenomiX, c/o Institut de Génomique Fonctionnelle, Montpellier, France

Abstract:

Neurotrophins and their receptors control a number of cellular processes, such as survival, gene expression and axonal growth, by activating multiple signalling pathways in peripheral neurons. Whether each of these pathways controls a distinct developmental process remains unknown. Here we describe a novel knock-in mouse model expressing a chimeric TrkA/TrkC (TrkAC) receptor from *TrkA* locus. In these mice, prospective nociceptors survived, segregated into appropriate peptidergic and nonpeptidergic subsets, projected normally to distinct laminae of the dorsal spinal cord, but displayed aberrant peripheral target innervation. This study provides the first *in vivo* evidence that intracellular parts of different Trk receptors are interchangeable to promote survival and maturation of nociceptors and shows that these developmental processes can be uncoupled from peripheral target innervation. Moreover, adult homozygous TrkAC knock-in mice displayed severe deficits in acute and tissue injury-induced pain, representing the first viable adult Trk mouse mutant with a pain phenotype.

Full text: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3916231/