TWO DIFFERENT POSSIBLE ORIGINS FOR AXONAL RNA: A) TRANSPORT FROM THE NEURONAL SOMA AND B) TRANSFERENCE TO AXONS FROM SURROUNDING GLIA

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Ribosomes and mRNAs are accumulated in cortical periaxoplasmic domains of axons (PARPs), related to actin network,(Koenig & Martin,1996). Before 1996, few authors claimed that axonal protein synthesis occurs ("Local Protein Synthesis",LPS), in opposition to the dogma saying that all axonal proteins are synthesized in the perikarion and transported to the axons. However, LPS, has been demonstrated to occur, in restricted peripheral domains of cells, completely different than neurons, such as fibroblasts and yeasts. In these cells, mRNAs are targeted to the place where they must be translated by the binding of proteins (Trans Acting Factors, TAF), to a specific Cis sequence of the UTR region. Molecular motors such as Kinesin or Myosin Va, transport these Ribonucleic Protein (RNP) complex to the target site. We demonstrate that axonal PARPs contain Actin mRNA, Myosin Va mRNA, Kinesin and Myosin Va proteins, but also ZBP1 protein (Actin mRNA TAF) and HuD protein (TAU mRNA TAF). The latter means that these mRNAs are specifically targeted to PARPs, maybe coming from perikarion. On the other hand, Schwann cell express neuron specific mRNAs (neurofilaments), and we demonstrated by immuno-electron-microscopy, that ribosomes and RNP full vesicles seems to be transferred from glia to axons. Is this an alternative way to convey RNAs to PARPs? NIH,R03,TW007220 FIRCA.
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