Structural variations on cellular cytoskeleton’s architecture

Y. Gimenez-Molina¹, J. Villanueva¹, M. del M. Francés¹, I. López-Font¹, S. Viniegra¹, L.M. Gutiérrez¹.

¹ Instituto de Neurociencias, Centro Mixto Universidad Miguel Hernández-CSIC, 03550, Sant Joan d’Alacant (Alicante), Spain. luisguti@umh.es, jvillanueva@umh.es

From simple cellular structures to complex organelles are required in neurotransmission. We are focus on studying one of these cellular structures called cytoskeleton using the chromaffin cell neuroendocrine model. Cytoskeleton structure plays fundamental roles in many aspects of cell biology, influencing both basic structure and functional specialization. Real time dynamics experiments offered by our group provided amazing evidence that cytoskeleton was a dynamic structure [1]. Dynamical feature are related to fibers´ movements inside this network and changes on structure configuration. Fibers movements have been explained by several elements such as myosin [2] but changes on the configuration can be explained only by changes inside this structure in response to stimulus. Our studies about cytoskeleton changes are related to actin aggregates area changes and intensity variations after stimulation. We think these aggregates changes could be based on a recruitment process of fibers from some points to others inside network offering a new configuration of fibers and holes after stimulation. Moreover, we have recently found that this active structure shows a different spatial distribution in different cell conditions. We have studied spatial distribution of this network on cultured isolated chromaffin cells and tissue slices from adrenal medulla and we have found notable differences. The first one shows a cortical network near plasma membrane while second one shows a wide cytoskeleton located on cortical zone and cytosolic area. We think this different spatial distribution offers changes not only on cytoskeleton structure but also on relevant elements with cytoskeleton association and neurotransmission role such as vesicles full of neurotransmitters. Our results based on analyzed images from both confocal and electron microscopy are a definitive evidence.

Referencias
