

Abstract Submitted
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Antiphase calcium oscillations in astrocytes via inositol (1,4,5)-triphosphate regeneration. GHANIM ULLAH, PETER JUNG, ANN H. CORNELL-BELL — In cultured astrocytes, antiphase oscillations in the intracellular free calcium concentrations have been observed in nearest neighbor cells that are coupled through gap junctions. A mathematical model is used to investigate physiologic conditions under which diffusion of the second messenger inositol (1, 4, 5)-triphosphate (IP3) through gap junctions can facilitate synchronized antiphase calcium oscillations. Our model predicts antiphase oscillations in both calcium and IP3 concentrations if a) the gap junction permeability is within a window of values and 2) IP3 is regenerated in the astrocytes via Phospholipids-C δ . This result sheds new light on the current dispute on the mechanism of intercellular calcium wave propagation since it provides additional evidence for a partially regenerative mechanism as the model excludes synchrony in the absence of IP3 regeneration.

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