



ID de Contribution: 216

Type: **Contribution orale**

Transport properties in inert 2D Droplet Interface Bilayer Networks

vendredi 7 juillet 2023 10:03 (12 minutes)

In a tissue, cells that are in direct physical contact with each other can exchange ions or molecules via protein clusters called gap junctions, that form channels across the membranes of adjacent cells. Artificial systems that mimic cellular tissues can be used as a way to overcome the complexity of cell-cell communication in biological tissues. For this, a simplified biomimetic approach, coupled with theoretical modeling is used. Tissues are mimicked with 2D arrays of aqueous droplets connected by lipid membranes called Droplet Interface Bilayers (DIBs) decorated with inert transmembrane proteins. The diffusion of carboxyfluorescein across the DIB network is thoroughly studied. The results are directly confronted with the theoretical models of the transport of ions in these artificial tissues using Continuous Time Random Walks

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Classification de Session: Mini-colloques: MC04 Mécanique et le vivant

Classification de thématique: MC4 Mécanique et vivant