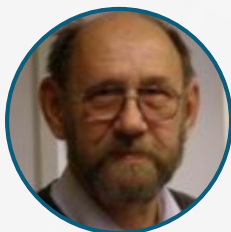




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Membrane rafts organizing proteins?

Abstract: Membrane rafts play a crucial role in many important cellular functions. Our research on erythroid cells led us to hypothesize that specific interactions of flotillins with MPP1 are responsible for membrane raft domain organization and regulation. Recently, we asked whether the flotillin-based protein interaction network with specific membrane proteins underlies the mechanism of raft-domain formation and regulation in cells with low expression of MPP1.

We sought to identify other flotillin partners via the immobilized recombinant flotillin-2-based affinity approach coupled with mass spectrometry, further confirmed via immunoblotting and co-immunoprecipitation. Moreover, this newly discovered interaction was demonstrated via overlay assay using recombinant EFR3A and flotillin-2. EFR3A is a stable component of the detergent-resistant membrane fraction of HeLa cells, and its presence was sensitive to cholesterol depletion. While silencing the EFR3A gene expression, we observed decreased order of the plasma membrane of living cells or giant plasma membrane vesicles derived from knocked down cells and altered mobility of the raft probe, as indicated via FLIM and spot-variation FCS. Moreover, silencing of EFR3A expression was found to disturb epidermal growth factor receptor and phospholipase C gamma phosphorylation and affect epidermal growth factor-dependent cytosolic Ca²⁺ concentration.

Our data indicate that at least two palmitoylated proteins, MPP1 or EFR3A are engaged in the raft domain organization. This implies the participation of this interaction in regulating multiple cellular processes, including those connected with cell signaling, which points to the possible role in human health, particularly human cancer biology.

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Keywords: raft domain organization and regulation, flotillins, flotillin-2; EFR3A, membrane order, FLIM, svFCS, EGFR

Biography: Aleksander F. Sikorski is a retired professor in biochemistry and cell biology of the University of Wrocław, now working at the Research and Development Centre, Regional Specialist Hospital in Wrocław. His major scientific interest is membrane biochemistry, in particular, lateral organization of biological membranes and liposomes as drug carriers. He has been an author and co-author of more than 130 scientific papers and supervised 28 Ph. D. graduates. He is one of founding editors and since 2016 Editor-in-Chief of the international journal "Cellular and Molecular Biology Letters" (Established in 1996, i.f. 9.2) which is now published in BMC/Springer Nature.