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Coarse-grained simulation of dynamin-mediated fission MARCUS MULLER, GUOJIE ZHANG, MARC FUHRMANS, Georg-August University, Goettingen, Germany — Fission is a process in which a region of a lipid bilayer is deformed and separated from its host membrane, so that an additional, topologically independent compartment surrounded by a continuous lipid bilayer is formed. It is a fundamental process in the compartmentalization of living organisms and carefully regulated by a number of membrane-shaping proteins. An important group within these is the dynamin family of proteins that are involved in the final severance of the hourglass-shaped neck, via which the growing compartment remains connected to the main volume until the completion of fission. We present computer simulations testing different hypotheses of how dynamin proteins facilitate fission by constriction and curvature. Our results on constraint-induced fission of cylindrical membrane tubes emphasize the importance of the local creation of positive curvature and reveal a complex picture of fission, in which the topological transformation can become arrested in an intermediate stage if the proteins constituting the fission machinery are not adaptive.

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