

Pearling Effect Induced by Presence of Nano-Particles and Focused Laser Beam using Digital Holographic Microscopy

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Dynamics of liquid-crystalline Myelin Figures (MFs) is a multifaceted issue depending on various elements, which have not been fully resolved yet which could be found in disease living cells and their formation and dynamics in various conditions have been of high interest. Myelin Figure is formed at membranes as a consequence of cellular swelling in cell injury. The major part of a cell membrane consists of phospholipids that is crucial in the study of the morphology of MFs deformation.

In this paper, we present a systematic experimental study on MFs deformation induced by presence of nanoparticles and focused laser beam using Optical Tweezers (OT). Quantitative analysis of MF dynamical behavior was performed using Digital Holographic Microscopy (DHM). Our study reveals that by applying the focused laser beam, MF tubes are stimulated and fluctuations on their surface could be seen. Our experimental results show that if the duration of applying the laser beam is short, they can be slowly returned to the previous state. But as the time increases, the tubes are deformed to form a chain of pearls.

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