

Confocal Reflective Phase Microscope to Probe Membrane Dynamics

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Membrane fluctuation and tension are of high importance understanding multiple cellular mechanotransduction. By using novel confocal imaging technique, we are able to measure the fluctuation of label-free membrane non-invasively in nano-scale. Cellular plasma and nuclei membranes fluctuations with nanometer range deformation at milliseconds scale are captured by high-speed camera.

High-speed multi-focal scanning using DMD micro-mirrors array is performed for full-field confocal imaging and a common path interferometer attached at imaging arm, used to detect the quantitative phase information. Interferograms recorded during changes in membrane tension (such as osmotic shock) and reconstructed phase provides the membrane fluctuations that are correlated with the membrane tension. We are using confocal reflection phase microscopy to measure relative changes in membrane tension during bile canaliculi contraction cycle.

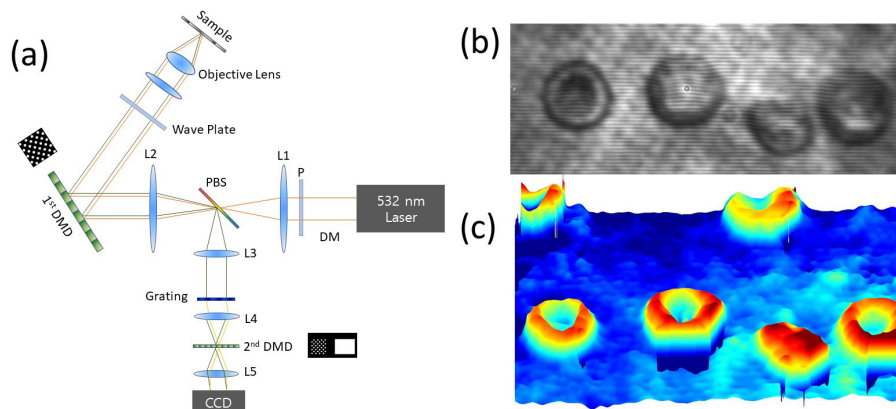


Figure 1: (a) Illustration of microscope design. (b) and (c) Image and 3D illustration of red blood cells.

References

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