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**Signaling and Dynamic Actin Responses of B Cells on Topographical Substrates** CHRISTINA KETCHUM, Biophysics Program, University of Maryland, XIAOYU SUN, JOHN FOURKAS, Department of Chemistry, University of Maryland, WENXIA SONG, Department of Biology and Molecular Genetics, University of Maryland, ARPITA UPADHYAYA, Department of Physics, University of Maryland — B cells become activated upon physical contact with antigen on the surface of antigen presenting cells, such as dendritic cells. Binding of the B cell receptor with antigen initiates actin-mediated spreading of B cells, signaling cascades and eventually infection fighting antibodies. Lymphocytes, including B cells and T cells, have been shown to be responsive to the physical parameters of the contact surface, such as antigen mobility and substrate stiffness. However the roll of surface topography on lymphocyte function is unknown. Here we investigate the degree to which substrate topography controls actin-mediated spreading and B cell activation using nano-fabricated surfaces and live cell imaging. The model topographical system consists of 600 nanometer tall ridges with spacing varying between 800 nanometers and 5 micrometers. Using TIRF imaging we observe actin dynamics, B cell receptor motion and calcium signaling of B cells as they spread on the ridged substrates. We show that the spacing between ridges had a strong effect on the dynamics of actin and calcium influx on B cells. Our results indicate that B cells are highly sensitive to surface topography during cell spreading and signaling activation.

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