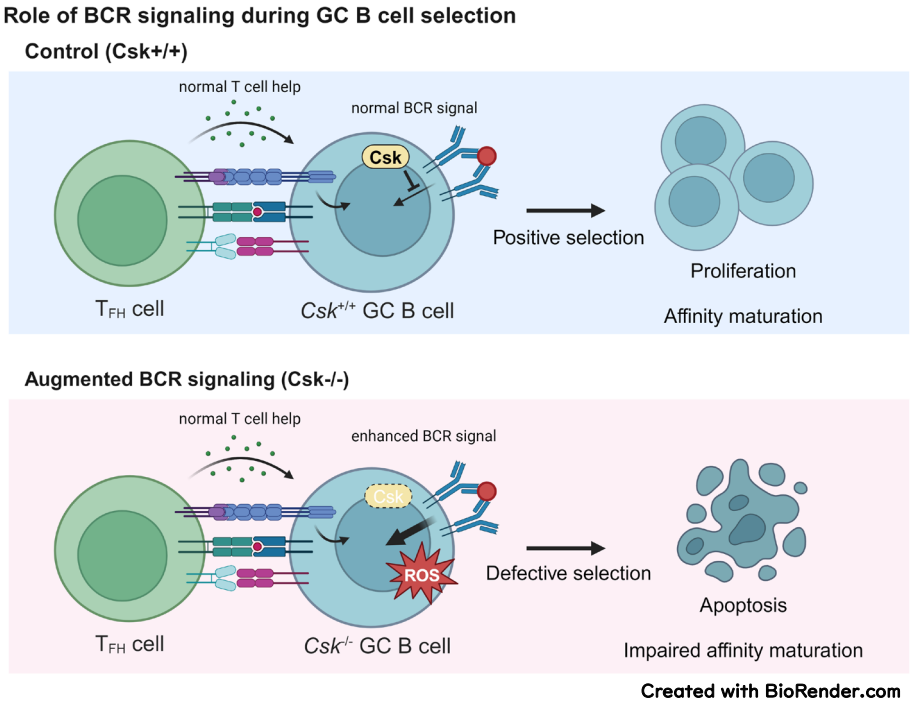
Understanding the mechanism for B cell selection
- germinal center reaction underlying antibody affinity maturation -

Keywords: antibody, affinity maturation, B cell, germinal center

- The authors analyzed the role of B cell receptor signaling during germinal center reaction.
- Enhanced germinal center B cell receptor signaling causes increased reactive oxygen species, leading to apoptosis.
- Csk tyrosine kinase plays a critical role in the regulation of germinal center B cell receptor signaling and is essential for affinity maturation.

Germinal center (GC) is the primary site where B cells undergo affinity maturation, the process where the average affinity of antibodies increases with time after immunization. The complex mechanism for GC B cell selection during affinity maturation process is not fully understood. The research group of Takeshi Inoue (The University of Tokyo and Osaka University), Masato Okada (Osaka University), and Tomohiro Kurosaki (RIKEN and Osaka University) examined the role of B cell receptor (BCR) signaling during this process.

Positive selection of GC B cells is regulated by synergistic contribution of BCR signal and T cell help signal. To investigate the role of BCR signaling for GC B cell selection, the research group employed a Csk (a tyrosine kinase attenuating BCR signaling) mutant mouse model in which Csk-deficiency in GC B cells resulted in augmentation of net BCR signaling with no apparent effect on T cell help signal. They found that Csk is required for GC maintenance and efficient antibody maturation. Mechanistically, Csk-deficiency results in increased reactive oxygen species (ROS), leading to GC B cell apoptosis. These findings suggest that attenuation of the BCR signal restrains hyper-ROS production, thereby protecting GC B cells from apoptosis and contributing to efficient affinity maturation.



Article

Journal: *Journal of Experimental Medicine (JEM)* May 16, 2024 online

Title: "Csk restrains BCR-mediated ROS production and contributes to germinal center selection and affinity maturation"

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DOI: https://doi.org/10.1084/jem.20231996