Mechanisms of How PI3K p110a Isoform Inhibits Antibody Class Switch through AID Expression

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The purpose of this project was to investigate how an increase or decrease of the functions of the PI3K p110a isoform affects AID expression to control antibody class switch. Since AID is a prerequisite for antibody class switch/class switch recombination (CSR), we hypothesize that PI3K p110a may inhibit CSR via down-regulating AID expression in activated B cells The experiment involved using CH12 parental line B cells as controls and B cells with an overexpression or depletion of the p110a isoform as our test subjects. Primary B cells were cultured with lymphocyte medium and CH12 cells were cultured with CH12 medium like my previous experiment, but cell culture, antibody class switch assay, western blot, and flow cytometry were used to assess the amount of AID present in each sample. The data collected did support the original hypothesis. Overexpression of PI3K p110a in B cells led to a decrease in AID production therefore inhibiting IgG1 class switch from 29.3% to 1.76%. Depletion of p110a in B cells increased AID expression and therefore increased the amount of IgA expressing cells from 24.0% to 43.3%. This shows how p110a affects AID expression which in turn acts as a regulator of CSR. These findings lead me to believe that p110a isoform indirectly affects CSR by directly regulating AID expression. This gives us a more accurate target for fighting the cause of antibody-related diseases, giving us better insight for treatments.

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