**Investigating the Long-term Effects of Alcohol Consumption by Pregnant Mothers on the Immune System of Children**

Growing evidence in research suggests that alcohol consumption results in decreased effectiveness of the immune system and increased occurrence of infectious diseases. In particular, alcohol has been found to alter the inflammatory response [1], which is a non-specific mode of defence that promotes the recruitment of immune cells to sites of infection through signalling molecules [2].

Beyond direct alcohol consumption, alcohol exposure to the developing fetus can also occur when pregnant mothers consume alcohol. Similar to the decline of the immune system observed as a result of direct alcohol consumption, children who were exposed to alcohol during development in the womb have been observed to have abnormal white blood cells and a greater incidence of both life-threatening and minor infectious diseases [3-4].

However, it is currently unknown if alcohol exposure to the developing fetus causes immune deficiency long-term, after children have reached adulthood. Therefore, this proposed project aims to use a mouse model to assess the long-term effects of early alcohol exposure on the immune system by investigating if alcohol exposure to the developing fetus contributes to decreased production of signalling molecules by immune cells in the lungs during adulthood.

In brief, the major steps of the proposed experiment are as follows:

* Feed pregnant mice alcohol to expose developing fetuses to alcohol.
* After offspring have reached adulthood, infect the lungs to stimulate an immune response.
* Assess the production of signalling molecules by immune cells in the lungs.
* Compare results to adult mice which have never experienced early alcohol exposure.

If immune cells from adult mice which experienced early alcohol exposure show similar production levels of signalling molecules compared to normal adult mice, this would suggest that immune deficiencies resulting from early alcohol exposure do not extend to adulthood. However, if immune cells from adult mice which experienced early alcohol exposure show different production levels of signalling molecules compared to normal adult mice, this would suggest that early alcohol exposure leads to long-term immune deficiencies.

By increasing our understanding of the long-term consequences of early alcohol exposure, we may gain knowledge that will motivate the population of pregnant alcohol users to reduce alcohol consumption in order to promote healthy children who are less susceptible to infectious diseases. As 1 in 13 pregnant women have reported to consume alcohol during pregnancy [5], this investigation is important because it can promote awareness of immunity-related problems associated with prenatal alcohol exposure that may put children at risk not only during childhood, but potentially throughout life.

References

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