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The Activity of Adenosine Deaminase in Pregnant Women with Elevated Fibrinogen Levels Caused by Hormonal Disorders

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ABSTRACT

Adenosine deaminase (ADA) is an essential enzyme within the purine salvage pathway, responsible for the irreversible deamination of adenosine and 2'-deoxyadenosine to inosine and 2'-deoxyinosine. In humans, ADA is represented by two genetically and catalytically distinct isoenzymes: ADA1 and ADA2. The isoenzyme ADA2 is a secreted protein produced by activated monocytes/macrophages and dendritic cells. Normal pregnancy is typically associated with a suppressed cellular immune response in the third trimester, accompanied by alterations in the blood plasma activity of the ADA2 isoenzyme. The literature presents conflicting data on this matter; while some studies have reported decreased ADA2 activity in pregnancy compared to non-pregnant women, other findings suggest an increase in activity. In our current study, we observed an elevation ($p>0.05$) of ADA2 activity in normal pregnancies (n=35, 10.05±0.593 U/L) when compared to non-pregnant controls (n=20, 8.70±0.589 U/L). However, pregnancies complicated by hormonal imbalances and elevated fibrinogen levels exhibited a significant decrease in ADA2 activity in the first trimester (6.737±0.307 U/L) compared to normal levels (9.218±0.508 U/L, $p<0.0001$). Interestingly, a correlation between ADA2 activity and fibrinogen levels was observed: negative in the normal pregnancy group (n=11; r=-0.588, $p<0.080$) and positive in the hyperfibrinogenemic group (n=33; r=0.368, $p<0.038$). Although adenosine and fibrinogen do not directly interact, their levels can vary synchronously in various pathological states. Elevated fibrinogen is typically associated with inflammatory processes. Adenosine, a known anti-inflammatory factor, can increase in such conditions, and ADA2 plays a crucial role in controlling adenosine levels during pathology. We hypothesize reduced ADA2 activity in pregnancies with high fibrinogen aids immune suppression and adenosine maintenance, potentially activating platelet receptors for blood clotting. ADA levels could be a vital biomarker for identifying pregnant women at risk of complications, guiding future therapeutic strategies.

Keywords: adenosine deaminase, fibrinogen, pregnancy, biomarker

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