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Selective Suppression of Maternal IgG Anti-Central Nervous System Antibody Reactivity

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Abstract. During pregnancy, it is possible that mothers may produce IgG antibodies directed against CNS antigens, which upon crossing the placenta would cause neurologic impairment in the offspring. Since anti-central nervous system (CNS) immunoreactivity is present in normal individuals, it is important to establish background rates in healthy mothers and infants. 101 mother-infant pairs were studied. Serum samples were obtained from the mothers at the time of hospital admission for delivery. Cord blood samples were taken from the infants at the time of birth. In all cases these were uncomplicated pregnancies and full-term deliveries. The serum samples were screened against Western blots of normal, human, adult, autopsy-derived frontal cortex (FC) and cerebellum (CER). To detect the presence of antibodies directed against embryonic CNS antigens, the serum samples were also screened against Western blots prepared from embryonic day (E) 17 and adult mouse cerebral cortex specimens. In the case of IgG there was no banding detected in infants, whereas in mothers the incidence of immunoreactive banding against FC was 1% and against CER was 2%. The maternal IgG anti-CNS reactivity incidence is significantly less than that seen in normal adults ($p < 0.001$). In the case of IgM, when screened against FC and CER, there was no banding detected in infants, whereas in mothers the incidence of banding was 34 and 26% respectively, a result which is in keeping with previous observations. When screened against E17 mouse CNS tissue the incidence of IgG banding in both mothers and newborns was 10%, whereas against adult mouse cortex the respective incidence were 9 and 12%. These results indicate that there is a selective suppression of maternal IgG anti-CNS antibodies during pregnancy. These results also indicate that there is a very low incidence of background IgG anti-CNS reactivity in term mothers using human CNS as substrate. Thus, these techniques are appropriate ones to use in investigating the presence of maternally derived IgG anti-CNS antibodies as potential pathogens in infants born with CNS disorders. However, results from the use of adult or fetal mouse CNS tissue as substrate would be more difficult to interpret because of the approximately 10% background IgG reactivity.