Can Microchimerism be an Etiologic Factor in Psychotic Disorders? A Hypothetical Suggestion.

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Abstract:

In this short article a hypothesis is proposed to explain the role of microchimerism in the etiology of psychotic disorders. Possible methods to analyze this hypothesis are also discussed.

Key words: postpartum depression, microchimerism, postpartum psychosis, psychiatric diseases, autism, schizophrenia

I would like to share with the readers of this journal my hypothesis proposal regarding the etiology of schizophrenia and psychotic disorders. The main basis of this hypothesis microchimerism, which is known to play an etiological role in autoimmune diseases, may also be the causative factor in the development of schizophrenia and postpartum psychosis.

Microchimerism is the existence of small amounts of DNA in the body coming from a geneticly different person. During pregnancy, hematopoitetic cells cross the placenta both ways. It is known that cells belonging to the fetus reach the maternal blood circulation and are distributed to various tissues in the mother. This is called fetal microchimerism. A study showed that in early pregnancy 20cc. of maternal bloods contained more than 200 cells of fetal origin and was possible to determine the sex of the baby, trisomi and dizomi 21 (1). During pregnancy whereas there is a tendency of suppression of thyroid autoantibodies and Graves disease, most of the women (8-10%) have these diseases 3-12 weeks postpartum. Some similarities between autoimmune diseases and chronic graft versus host disease, the increase in incidence of autoimmune diseases in women after child bearing age and persistence of microchimerism in maternal blood and tissues for a long time lead to the hypothesis that microchimerism may play a role in the etiology of autoimmune diseases (2,3). Even though blood-brain barrier prevents the passage of cells, during pregnancy, via mechanism that are unknown to us today, there may be migration of microchimeric fetal cells. The presence of autoimmune thyroiditis should make us wonder if postpartum psychosis and depression are due to microchimerism of fetal cells.

Even though today it is not possible to identify and locate the microchimeric cells that are located in the brain, we should consider using low dose corticosteroid treatment as an autoimmune suppressant therapy in the treatment of postpartum psychosis and depression in addition to psychiatric medication.

In the literature there is no data regarding a connection between psychiatric illnesses and microchimerism. In a study it was shown that the prevalence of postpartum depression is 17.5% and increases with the number of pregnancies ($p<0.01$). According to his data the women who had prior pregnancies have a higher incidence of postpartum depression compared to those woman who never had a preganacy (p:0.01 vs p:0.032) (4).

It is also important to evaluate the matter in regards to cells passing from the mother to the fetus. During the pregnancy when organogenesis is still taking place it is possible for the viruses originating from a maternal illness to cross the placental barrier and cause damage in the fetal brain. A possible secondary signaling reaction to the fetal brain infection may activate and migrate the maternal lymphocytes (or stem cells) towards the fetal brain tissue to be able to fight the fetal infection (as the fetal inflammatory response is not mature). Thus, these maternal origin microchimeric cells may reach the fetal brain to treat and to ensure survival of the fetus. However, after they have completed their duty, may very well stay in the fetal tissues and even differentiate into part of the functioning brain cells. This, hypothesis may explain the reason for seasonal changes in the incidence of schizophrenia. During the months of winter and spring when the incidence of viral infections as well as the incidence of schizophrenia births are high, supporting my hypothesis (5)

There are many things that are unique to being an individual like the scent, finger print and voice due to different DNA structure. Thus, the microchimeric cells of maternal origin which incorporate into the fetal brain will produce different neuromediators than of the offspring. Two different neuromediators produced by two different DNA in the brain starting from birth, may lead to differences and ‘’soft’’ neurologic signs in children who will become schizophrenics.

The neuromediators produced by two different DNA will affect the receptors in unpredictable ways, just like a key fits into a lock. The organisms response may of producing more neurotransmitters. In the clinic this is observed as increase in dopamine secretion and psychotic diseases. According to my hypothesis, the increase in dopamine (neurotransmitter) production is the cause but the end result of this phenomenon.

In addition, the presence of chimeric cells of maternal origin in the fetal brain may affect the neurodevelopmental morphology by disrupting the programmed off and on mechanisms in the genetic structure (due to differences in the mediator receptor system) leading to various diseases. Different signs and symptoms may be attributed to the variability of the location of the microchimeric cells. Thus, clinically we define schizophrenia as a disorder with positive or negative signs. Autistic type diseases may be due migration and location of the maternal chimeric cells within cerebellum.

Evaluation of the brains of schizophrenic patients after death to identify cells or group of cells with different DNA structures may be a method to test this hypothesis. In addition, tissue or blood samples obtained from various tissues to identify microchimeric DNAs may also support this hypothesis. This can also be applied to patients with autoimmune diseases.

Although it is difficult to test this hypothesis in the experimental and in the clinical setting the researchers should keep in mind that microchimerism may be an etiological factor in the origin of psychiatric diseases.

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