Inflammation in Psychiatry: the studies dedicated to the inflamed souls

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The word “Psychiatry” based on two ancient Greek words; “Psykhe” which means “soul” and “iatrikos” which means “medical”. The word “inflammation” came from a Latin word “inflammo” which means “I ignite” and thus “inflammation” indicated burning, heat and irritation. Therefore, psychoneuroimmunology could be considered as a field of studies on the inflamed souls. When we talk about “inflammation” in psychiatry, there is always a question - “what do you mean by inflammation?”. As we all know, there are five cardinal signs of inflammation: calor (heat), rubor (redness), dolor (pain), tumor (swelling) and funtio laesa (loss of function). We also learned that in histopathology, inflammation is characterized by infiltration of neutrophils and secretion of inflammatory mediators such as cytokines and chemokines. Fortunately, we do not see a red area or swelling of the brain. Nevertheless, loss of function and pain are very well presented in terms of the symptoms of the psychiatric disorders. We can feel the “pain in mind” of our patients, can’t we? And the psychomotor retardation, social withdrawal and cognitive impairment are also very clear signs of loss of function. Psychomotor agitation, irritability and aggressive behavior are also the abstract reflections of ‘heat’ and ‘redness’. In addition, in some psychiatric disorders, the increase in the volume of certain areas of the brain or decrease in the volume at certain areas can be associated with the results of inflammatory reaction. We also could not find neutrophils infiltrations in brain areas of psychiatric patients in post mortem studies or through imaging. Regarding the danger-associated molecular patterns (DAMP) which are seen in the inflammatory reactions without pathogens, the adenosine triphosphate (ATP) is the only one which could be increased in the psychiatric disorders related conditions through kynurenine pathway. Although those associated conditions between biological and behavioural changes in psychiatric disorders and the cardinal signs of inflammation can quite clearly be observed, we need to define or explain what ‘inflammation in psychiatry’ is scientifically to be accepted widely and move on further with research and innovation to bring some applicability to the health care system. Some of us who are working in the field of immunology and psychiatry or psychoneuroimmunology, we explain that the inflammation in psychiatric disorders is a mild inflammatory reaction in the system in terms of an increase in circulating pro-inflammatory molecules or inflammatory mediators such as cytokines, chemokines and acute phase proteins either in the blood or in other body fluids.
including cerebrospinal fluid. With advancement in technology, in the near future, we might be able to define better and can bring some early diagnostic tools or some biomarkers for personalized medicine in psychiatry, or in other words, the remedy for the inflamed souls.

**Immune-mediated models for psychosis**

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There are three immune based pathways, discussed in the literature regarding the pathophysiology of psychosis based on immune challenge or immune activation. The first pathway is via direct autoimmune mechanisms in which e.g. autoantibodies induce vasculitis or receptor autoantibodies interfere with important neuro-receptors. The second pathway is via infections of the brain, e.g. HIV infections or infections with *Toxoplasma gondii*. The third pathway represents a more complex immune-mediated developmental two hit model for psychosis. In genetically susceptible individuals environmental influences (infection or stress in utero or early life, representing first hits) induce excessive inflammatory activation of monocytes/ microglia and HPA-axis changes leading to developmental brain abnormalities (a “vulnerable brain”) with primed microglia, defective in e.g. supporting sufficient neuronal growth and axon guidance for important brain area’s such as area’s involved in the stress response. The second hit occurs later in the form of various environmental or endogenous alterations (microbes, stress, puberty, postpartum period) leading to a further and excessive activated microglia resulting in abnormalities of the neuronal circuitry in the brain and psychosis. The figure below depicts those three immune based pathways involved in psychosis.
Activities in the second half of 2014

(1) At the 16th World Congress of Psychiatry (WPA 2014), 14th to 18th September 2014 in Madrid, Spain –
   a. Intersectional Symposium: Intersectional view on personalized medicine in future psychiatry: what will the current biological markers bring? biomarkers (Myint AM, Müller N – chairs) – on the 15th of September from 15:00 to 16:30 in the Room 4
      i. Immune related metabolic biomarker in personalized medicine: possibilities in practical application – Myint AM, Munich/Maastricht/Magdeburg
      ii. Neuroimaging biomarkers in personalized medicine: possibilities in practical application – Bogwardt S, Basal
      iii. Genetic markers in personalized medicine in psychiatry: possibilities in practical application – Schulze T, Munich/Göttingen/Johns Hopkins
      iv. Overview on use of biological markers in personalized medicine in future psychiatry – Abou-Saleh MT, London
   b. Symposium – Stratification of patients using inflammatory biomarkers (Myint AM, Müller N – chairs) – on the 17th of September from 12:00 to 13:30 at Room 9
      i. Phenylalanine and Tyrosine in Major Depression – Sperner-Unteweger B (Innsbruck)
      ii. Kynurenines and related markers in major depression and schizophrenia – Myint AM (Munich/Maastricht/Magdeburg)
      iii. Cytokines and kynurenines in bipolar disorder - Mülßbacher M (Salzburg)
      iv. Growth factors in major depression – Halaris A (Chicago)
      v. Stratification for response to treatment with COX2-inhibitor – Müller N (Munich)
   c. Section Meeting and new election for Section Immunology and Psychiatry – from 14:30 to 15:30 Room A10.2

(2) At 2nd Joint WPA-INA-HSRPS International Psychiatric Congress – October 30th to November 2nd, 2014 in Athens, Greece –
   a. Section Symposium – Psychoneuroimmunology assists in the differential diagnosis of major psychiatric disorders (Halaris A, Leonard BE – chairs)
      i. Halaris A (USA)
      ii. Myint AM (Germany/Netherlands)
      iii. Boufidou F (Greece)
      iv. Leonard BE (Ireland)

(3) At DGPPN Congress – November 26th to 29th, 2014 in Berlin
   a. Symposium – Inflammation in Mood Disorders (Müller N, Myint AM – chairs)
      i. Mülßbacher M (Salzburg)
      ii. Myint AM (Germany/Netherlands)
      iii. Sperner-Unteweger B (Austria)
      iv. Müller N (Germany)
      v. Schulze T (Germany)
Normally, at the meetings and symposium some of our members are involves but not all. However, at the PNI Expert meetings in Günzburg, most of our members attended. Therefore, normally, photos with few members were not included in the newsletters. However, this time our group photo from PNI Expert Meeting this year is included here.

Note: This newsletter is an informal newsletter published on-line only on the WPA website for the section members and WPA members who are interested in the field of Immunology and Psychiatry. The short papers are written by section members and edited by section secretary Aye Mu Myint. Members are invited to contribute to the newsletter for the information for the other members of the section as well as general readers from the association.