The Role of Infectious Disease and Inflammation in Psychiatric Illness

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Abstract: The role of inflammation in mental illness, and neuropsychiatric illness broadly, is becoming increasingly accepted. One cause of CNS inflammation and subsequent mental illness is thought to be represented by infective organisms including viruses and bacteria. Recent research has demonstrated infective agents including bacteria to communicate electrically through ion channel mediated communication. To this end, the current report investigates the potential implication of infective agents (including bacteria) in respect of psychiatric symptoms including auditory hallucinations and distorted perceptions. The report then details any relevant clinical applications of the theoretical conceptualization espoused.

Keywords (Terms): Consciousness; Inflammation; Infection; Ion Channel; Psychiatry.

Infectious Disease, Inflammation and Psychiatric Illness

The role of inflammation in mental illness is becoming increasingly accepted. Recent research has investigated the use of anti-inflammatory agents including Remicade, Aspirin, Omega 3 and rosuvastatin in treatment of depression and schizophrenia (Amando, et. al., 2015; Stetka, 2015). The cause of inflammation is not yet completely understood. With that said, it would seem that a number of originating causes are likely (a multifactorial model of causation).

One cause of CNS inflammation and subsequent mental illness is thought to be represented by infective agents including viruses and bacteria (Insel, 2010; Nicolson & Haier, 2010; Stetka, 2015). Whilst it has not been ascertained whether the relationship is best categorized as association or alternatively causation, the following comprises a number of viruses which have been linked to mental illness: BDV; EBV; Herpes; And, the following includes bacteria which have been linked to mental illness: streptococcus; borrelia (LDAA, 2016; Misra, et. al., 2008; Nicolson & Haier, 2010; Stetka, 2015; TKF, 2016). Microbioata have also been linked to mental illness.

There seems a reasonable likelihood the basic connection exists in that the presence of infective organisms causes inflammation and the resulting inflammation causes subsequent disruption to the normal (or, optimal) thought patterns for the given person.

That being said, it is not clear how the infective agents cause symptoms such as auditory hallucinations and whether this is simply inflammation causing disrupted thought patterns, whether it can be further pinpointed, or, given some research has demonstrated a potential for infective agents to communicate (Reilly, 2015), whether in fact it may represent any potential form of communication between the infective agents and the CNS of the person.

Inf ective organisms including viruses and bacteria have been identified as a cause of epileptic seizures and auras (Misra, et. al., 2008), and it is therefore not difficult to comprehend the possibility of infective agents causing hallucinatory phenomena. It has been identified that bacteria can attempt to communicate with its surroundings (in particular, to other bacteria) through electrical communication methods, specifically ion channel mediated communication (Reilly, 2015). One core foundation in the generation of CNS activity is represented by voltage gated ion channel electrical activity (Saladin, 2001). Therefore, it is not difficult to conceptualize the possibility that infective organisms such as bacteria through their own ion channel mediated communication methods subsequently engage the CNS with collateral electrical stimulation (communication) that triggers off CNS activity including voltage gated ion channel activity, which comes across as communications from a foreign entity. In line with this, research has demonstrated that the mechanism the bacteria use in communication is surprisingly similar to a process in the human brain known as 'cortical spreading depression' which is linked to aura, migraines and epileptic seizures (Reilly, 2015). The view put forward by Reilly (2015) “bacteria communicate with one another in a similar way to nerve cells in the brain.”
In a report by Raymond (2016 a) the possibility of viruses being conscious and making conscious decisions was investigated. The definition of consciousness presented by Raymond (2016 a) was:

“An individual’s awareness of its existence within (and its interactions with) an external environment in which it resides.”

Key indicators of consciousness were identified as (Raymond 2016 a & 2016 b): 1) ability to make decisions that achieve a positive or strategic benefit; 2) learning; 3) survival instincts; and, 4) moral conduct.

It was noted that viruses “carry out a set of actions in order to achieve a positive (or, strategic) benefit, for instance drift, shift and morphological changes that achieve an enhanced survival benefit” (Raymond, 2016 a). Other infective agents including bacteria similarly carry out measures to achieve a survival benefit.

It was noted that this could be considered a very low level consciousness, based on the definitions of consciousness as espoused. However, after consideration of the scientific data, Raymond (2016 a) drew the conclusion that viruses, rather than being described as conscious, would better be described as ‘possessing an ability to sense surroundings,’ this being also the case for other infective agents such as bacteria.

It is however still worth considering whether the infective agent linked to the mental illness in the given person is making attempt to communicate with the person when symptoms such as auditory hallucinations occur. Infective agents are known to possess the potential to mimicry and therefore it is worth considering whether the infective agents are attempting to mimicry the actions of neurons as part of their ion channel mediated electrical activity and subsequently engage in communication with the CNS and therefore the person.

Given that by definition infective agents (e.g. viruses and bacteria) were found to fall short of possessing actual “consciousness” likened to that of a human being (Raymond, 2016 a), it would seem unlikely at this stage that any interaction of infective agents with the CNS be viewed as meaningful communication. If it is a form of mimicry then it would be better viewed as mimicry of the mechanistic aspects of the CNS (e.g. ion channel mediated communications) rather than consciousness and highly complex meaningful communications. The electrical activity of the infective agents then subsequently affecting the normal electrical activity of the CNS, causing subsequent meaningless disruption to the normal orderly thought processes with resultant symptoms including hallucinatory phenomena (example: auditory hallucinations), distorted perceptions, and feelings of oppression. This model of explanation is able to be aligned with current theories of bacterial communication, inflammation (an associated sign and compounding factor) and also mental illness.

Whilst the interaction with the CNS is, at this stage, likely to best be viewed as electrical discharge of meaningless information by both the infective agent (through its ion channel mediated electrical activity) and also the human CNS, it is still worth having considered the process. In addition, molecular mimicry may arguably induce autoimmune responses that could further explain the CNS inflammation on top of that related to general migration of inflammatory mediators in response to the infective agents.

Trauma is interesting to consider at this stage. Infections are more likely in tissues that have been compromised by trauma. It may be that psychological trauma can also compromise the CNS and result in decreased ability to withstand pathogens, in addition to a resultant inflammatory reaction in the CNS. It is already generally accepted that trauma can precipitate a wide spectrum of mental illness from depression through PTSD through potentially schizophrenia.

In terms of hereditary links, this model of mental illness could still be aligned with current and traditional theories that include genetic predisposition and low socioeconomic background as risk factors (Borrell-Carrió, et. al., 2004; Cohen, et. al., 2010; Engel, 1977; Sadock, et. al., 2009), as it may be that genetic predispositions could include factors such as weakened immune system function that allows for greater susceptibility to the given infective agents and, furthermore, people of low socioeconomic backgrounds are generally viewed as being at increased risk of adverse life circumstances and associated psychological trauma, in addition to poorer health status and increased risk of infection.

With the above said, there is in the field of psychiatry inclination by some to move on from the biopsychosocial model to a model more relevant to the current climate (Ghaemi, 2009). Given a key trend is the concept of consciousness, it would seem reasonable to take into consideration the inclusion of the concept of consciousness in future models (Raymond, 2016 b). In addition to consciousness, future models perhaps would also
benefit from including inflammation, infection and, given topics including CBT have emerged, revisitation of in-depth psychoanalysis in conjunction with the aforementioned topics particularly consciousness.

Clinical Applications

It would seem reasonable that patients could still explore the psychological meaning of hallucinatory and perceptual phenomena. However, it would seem likely that patients may also find the findings of the report useful as reassurance that negative, oppressing and harsh auditory phenomena being directed toward them can be rightly viewed as meaningless discharge of electrical activity that should be ignored as opposed to allowing the pseudo-communications to cause oppressive feelings or pessimism.

Areas for Future Research

It is interesting at this stage to consider scientific findings in relation to specialized communication and sensory mechanisms of other species. Birds are an example using sensory systems that sense the magnetic field of earth as a means for specialized navigation (Patullo & Macmillan, 2010; Raymond, 2016 a). Yabbies can communicate long distance through specialized electrical communications (Patullo & Macmillan, 2010; Raymond, 2016 a). Psychic phenomenon are becoming increasingly accepted and it may be worth considering whether there is any sensory ability of infective agents able to pick up on and receive information from the CNS of another person (also containing infective agents), which the CNS of the given person then processes. And, if so, what range (distance) this may occur across.

Another area for future research: whether religious phenomena including perceived communications with religious beings may in fact be explainable through the model of mental illness described (or, implied) in the current report, including that involving meaningless discharge of the CNS by way of mimicry by infective agents.

Of further interest with respect to the mimicry of neurons by infective agents (and as an area for further research) is that bacteria are only able to perform basic electrical firing of the digital (or, logic type) form with “yes / no” (0 or 1) type coding (GENNWS, 2016; Reilly, 2015). It may make scientific sense that this type of primitive electrical activity (firing) of bacteria could affect adversely the CNS of humans (complex beings) and represent a causative factor in connection with (or, associated with) the injurious “yes / no” or “black / white” type thinking that represents a key aspect of mental disorders including bipolar and the autism spectrum range.

Summary and Conclusion

The role of inflammation in mental illness is becoming increasingly accepted. One cause of CNS inflammation and subsequent mental illness is thought to be represented by infective organisms including viruses and bacteria. Recent research has demonstrated infective agents including bacteria to communicate electrically through ion channel mediated communication. The current report investigated the link between such electrical communication and psychiatric phenomena including auditory hallucinations and distorted perceptions. Based on the analysis, the report concluded that infective agents including bacteria and viruses may be implicated in CNS inflammation, the disturbance of ordinary thought processes, and linked to psychiatric phenomena including auditory hallucinations and distorted perceptions by way of the electrical communication methods they possess in addition to the aforementioned factors (including inflammation). That being said, based on the current theories of consciousness, any electrical communications by such infective agents to the CNS comprise meaningless electrical discharge of information (meaningless communications) as opposed to conscious and highly complex communications like that of human beings.

References


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**Biographical Notes**

The author (researcher) of the current report, Dr Simon Raymond MPH, is a consultant (specializing in medical and scientific research) and an Alumnus of Melbourne University (Rank of Number 1 in Australia and Number 33 in the World). The above stated researcher is also qualified as a statistical analyst (qualitative and quantitative), has acted as a reviewer for the respected Medical Journal of Australia, has received invitations internationally to review from prestigious medical journals including JAMA (Journal of American Medical Association) Network, received award in recognition of his research by Royal Australasian College of Surgeons (PSC, 2006) and invited to conferences internationally including USA and China as an official delegate and researcher. Dr Simon Raymond has acted as the principle researcher in the highest powered form of medical trial—Randomized Controlled Trial (RCT). The above stated researcher is also a member of the Golden Key International Society for honoured and outstanding academics and has been cited as a notable global leader.