

Psychoneuroimmunology and Chamomile: The Application of Herbal
Remedies for Illness and Disease Rooted in Inflammation Causation

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Chamomile is a flower plant known for its anti-inflammatory medicinal properties. As a tea, active constituents are extracted through infusion. Extracts of chamomile are also used topically in various forms such as ointments. Primary constituents of chamomile have been studied in order to determine the flowers anti-inflammatory properties. Through analyzing cytokines and their influence on inflammation and the immune system, one can comprehend the necessity of addressing the intricate communication between the nervous, immune, and endocrine systems in order to more successfully treat various ailments. Chamomile has been regarded as a soothing herb, however; the medicinal value of chamomile should be recognized when so much of the causation of ailments are dependent on inflammatory stress responses. When considering what has been revealed through the disciplines, psychoneuroimmunology and holistic medicine such as, viewing the body and mind as an interconnected web that of which cannot be so easily untangled or isolated from each other, it is imperative to incorporate various healing techniques and practices when preventing or combating illness and disease. When the mind is quiet, the body can go to work.

Octulosonic acid is a derivative from chamomile that has been proven in pharmacological studies to have anti-inflammatory properties (Zhao et al., 2014, p. 509). Roman chamomile constituents through isolation and evaluation studies have been noted for their influence on cellular targets pertaining to inflammation. Methanolic extract of flower heads of *C. nobile* suppresses intracellular oxidative stress. In addition, genes such as NAG-1 and NF- κ B are involved with the regulation of pro- and anti- inflammatory responses to diseases (Zhao et al., 2014, p. 512). Since stress increases biochemicals that cause inflammation in numerous tissues and cells and their receptors, regulating stress and fighting inflammation are both necessary to

fight off illness and disease. In addition, compounds of Roman chamomile proved to provide aid in the body's regulation of inflammation processes by directing multiple targets involved with metabolic as well as biochemical pathways (Zhao et al., 2014, p. 513). One of the advantages of herbal medicine is the ability to use herbs for more than one ailment. A majority of herbs will address multiple health concerns. Essential oil extracted from the chamomile flower contains components that have anti-inflammatory, anti-allergic, antispasmodic, anti-bacterial, analgesic, and sedative properties. Flavonoids, terpenoids, chamazulene, and bisabolol found in chamomile are responsible for such healing properties (Tadbir et al., 2015, p. 72). Studies have shown that anti-inflammatory properties of flavonoids found in chamomile aid in healing ulcers (Tadbir et al., 2015, p. 72).

Tadbir et al. did an experiment in which three groups of patients with minor aphthous stomatitis were administered either a placebo, chamomile, or triamcinolone (Tadbir et al., 2015, pp. 71). RAS (recurrent aphthous stomatitis) is an oral mucosal condition. Patients suffer from multiple ulcers (eight to ten millimeters) located on the floor surface of the mouth as well as other various mucosal surfaces like labial mucosa (inner lining of lips) (NIH Library, 2015). Triamcinolone is a medication that comes in several forms: aerosol spray, ointment, lotion, cream and liquid. It is used to treat inflammation, itching, redness, dryness and scaling of numerous skin conditions (NIH Library, 2015). Even though triamcinolone was found to be most effective in reducing ulcer size by day six, up to day three chamomile had the same effect as triamcinolone and further more, the extract of chamomile was reported to have one hundred percent effectiveness of reducing the pain of ulcers in the patients tested (Tadbir et al., 2015, pp. 71 & 75). Just as chamomile is multi-faceted in how it treats maladies, illnesses and diseases are multi-

faceted in that one disorder may provoke another disorder. Therefore, using a holistic approach would benefit an individual who may be able to fight off more than one health issue.

In another study, Chiappelli presents the hypothesis that since anxiety may be linked to part of the causation of RAS, then anxiety and other psycho-emotional states may also be a big predictor of IRIS (immune reconstitution inflammatory syndrome) (Chiappelli, 2015, p. 75).

Cross evaluating illnesses and diseases help scientists to understand etiology and therefore, proper treatment and care. Chiappelli states that anxiety and other psycho-emotional conditions may affect psychoneuroimmune regulation (Chiappelli, 2015, p. 75). He offers the example that immunophysiological processes influences viral immune surveillance (Chiappelli, 2015, p. 75).

Chiappelli refers to the immunophysiological processes of diseases to be a an “immune-inflammation microenvironment” where feedback loops, activation, effects and counter effects all are involved in a sensitive and complex interplay influenced by inflammation (Chiappelli, 2015, pp. 75 &76). The immune system is highly sensitive to inflammation. Inflammation makes the body more susceptible to infection and therefore, illness and disease. However, the immune system is not the only body system vulnerable where inflammation is concerned.

Endocrine glands secrete hormonal steroids which affect inflammation in the body as well. Corticosteroids treat various issues associated with inflammation. Corticosteroids mimic hormones secreted by adrenal glands to combat stress concerning injury or illness (NIH Library, 2015). However, corticosteroid side effects such as, high blood pressure, upset stomach, insomnia, and irritability have inspired scientists and patients alike to find alternative treatment(s) (Tadbir et al., 2015, pp. 71). Since chamomile does not have the same side effects as corticosteroids, it may be a beneficial to use chamomile as a supplement or in addition to other

medications. Tolerance can be an issue for hormonal steroids as well. For example, the body becomes less sensitive to glucocorticoids and the anti-inflammatory mechanism they induce. The continual inflammation the body endures leads to illness and disease because the mechanisms that keep the body from chronic inflammation are not working properly (O'Conner, 2014, p. 623). By using supplements that combat inflammation an individual could avoid this desensitizing phenomenon that some steroids are prone to cause. Hormonal steroids come into play again when examining cytokines and their role in the body.

Stress ignites the immune system which leads to the aggravation of a variety of chronic inflammatory conditions in other parts of the body. Through being analyzed cytokines (small proteins secreted influencing the communication and interactions between cells) have been found to affect both the immune system and endocrine system (Wieck, 2014, p.18 & Zhang et al., 2007, p. 27). Cytokine IL-2 is responsible for the bolstering of effector T cells (lymphocytes/white blood cells) which are cells the thymus gland secretes when anticipating an immune repose (Wieck, 2014, p. 20). An increase in inflammation and stress increases the amount of receptors vulnerable to let in disease. For example, the ICAM-1 membrane protein is the protein associated with the common cold virus and when there is an increase in stress and immune activation, there is an increase in ICAM-1 membrane proteins and high-risk cells become more open to infection (McGraw-Hill, 2014, p. 139). A better understanding of how cytokine secretion is influenced by stress can be conveyed through studies that use the TSST.

The TSST (Trier Social Stress Test) analyzes biological changes patients experience while they are exposed to a controlled stressful situation. More specifically, the TSST in this case measured cortisol and heart rate while patients engaged in a mock employment interview and

mental arithmetic exercises (Wieck, 2014, p. 18). Wieck et. al, while using the TSST, found a correlation between cortisol commanding pro-inflammatory cytokine secretion and acute stress exposure, although other regulatory mechanisms were not as clear. Even though data collected from this experiment displayed a direct correlation between stress and cytokine activity, one of the major limitations of this study is that all of the patients tested were taking psychotropic drugs (Wieck, 2014, p. 20-21). Despite the fact that scientists must realize the limitations of their studies, findings that are consistent and supported through scientific methodologies unavoidably lend to further questions and investigations which provide a more well-rounded understanding of such inquiries.

Cytokines are assessed in another study that narrows in on stress and psychopathology in children. O'conner et al. expresses that since there is a considerable amount of data supporting that there is in fact a close relationship between the immune system and nervous system in adults, one can apply this occurrence to advancing the somatic and psychological health of a child (O'Conner, 2014, p. 616). Because there is extensive data to support the link between pro-inflammatory cytokines and various psychological and psychiatric conditions, O'Conner et. al expresses that further investigation of mechanisms and treatment options is imperative to improving child mental health and healthcare in general (O'Conner, 2014, pp. 616 & 620). Anxiety, cognitive function, and depression have also been associated with cytokines. Prolonged increases in pro-inflammatory cytokines direct the hypothalamus to activate symptoms such as, decreased activity, fever and fatigue (O'Conner, 2014, p. 620). Chronic symptomatic conditions can not only hinder a child's health at his or her current age, but also the immune system that they are developing over time. Since chamomile is mild enough for child consumption, more

tests and studies should address the safety and effectiveness of chamomile not only as a symptomatic remedy for children but as a supplement for preventive care as well.

Psychoneuroimmunology supports the interplay of the immune, nervous, and endocrine systems in regards to the manifestation and causation of illness and disease; therefore one can benefit from using chamomile as part of their regimen when combating illness or disease. The relationship between the nervous system, endocrine system and immune system is as complex as it is compelling. Once an individual recognizes the importance of treating the mind and body simultaneously, one can see the positive effects of addressing the human body in a more wholesome manner, as well as an entity worth caring for robustly and thoroughly.

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