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Music and the Immune System

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Abstract

There is considerable scientific rationale to support the use of music to enhance immunity via its powerful influence on emotions. Music's ability to alter mood and emotional state has long been known experientially, and more recently has been scientifically documented. Likewise, it is well recognized that mental and emotional states can alter autonomic nervous system (ANS) activity and balance. The ANS, in turn, can modulate virtually every aspect of immune function, both through direct innervation of lymphoid tissues and by way of its regulatory influence on immunomodulatory hormones. The interaction between feeling states, immunity and autonomic function has been highlighted by a number of studies showing that negative emotions such as anger and hostility stimulate sympathetic activity, increase the cortisol/DHEA ratio and suppress the immune system, while positive emotional states such as appreciation enhance parasympathetic activity, increase physiological coherence, reduce the cortisol/DHEA ratio and boost immunity.

Recent research has examined the physiological and psychological effects of music that integrates particular rhythmic patterns, tone textures, chord progressions and harmonic resonances specifically designed to help reduce stress, facilitate the experience of sustained positive emotional states and

enhance the benefits of stress management interventions. Used regularly in conjunction with an emotional self-management program, this scientifically designed music has been found to increase DHEA, reduce cortisol, improve autonomic balance and increase coherence in the ANS, facilitating the entrainment of physiological systems. In addition, this music has been demonstrated to help reduce stress and negative emotion and increase positive emotion in both healthy populations and in individuals with clinical conditions such as anxiety, depression, panic, arrhythmias, diabetes and chronic fatigue.

The present study examined the effects of music and positive emotional states on the immune system in healthy individuals ($n = 10$). Autonomic activity was assessed using power spectral density analysis of heart rate variability, and secretory immunoglobulin A (S-IgA), measured from saliva samples, was used a marker of immunity. The autonomic and immune effects of rock and New Age music selections were compared to those produced by Heart Zones, music designed to facilitate stress reduction and promote emotional balance. Listening to Heart Zones for 15 minutes produced a significant increase in total autonomic activity ($p < .05$) and an average increase of 55% in S-IgA levels ($p < .01$). In contrast, neither rock, New Age music nor a control period of silence produced significant changes in total autonomic activity or in S-IgA concentrations. Rock music decreased power in the high frequency region of the heart rate variability power spectrum ($p < .05$), suggesting a reduction in parasympathetic activity.

A second phase of the study examined the immune and autonomic effects of music used in conjunction with an emotional self-management intervention known as the Heart Lock-In, a technique designed to improve autonomic balance, increase physiological coherence and promote the experience of sustained positive emotional states. Performing the Heart Lock-In for 15 minutes without music produced a significant average increase of 50% in S-IgA levels ($p < .05$). However, the combination of the Heart Lock-In facilitated by the Heart Zones music increased S-IgA levels by 141% ($p < .01$), a significantly greater immunoenhancement than was produced by either the music or the intervention alone. The music combined with the Heart Lock-In also produced a significant increase in total autonomic activity ($p < .01$) as well as in power in the low

frequency region of the heart rate variability power spectrum (0.04-0.15 Hz) ($p < .05$). This is consistent with previous findings indicating that the use of music to facilitate heart- focused self-management interventions tends to produce a large, narrow peak in this low frequency range, which corresponds to the entrainment of respiration, blood pressure waves and brain wave patterns to the heart rhythms at a frequency of approximately 0.1 Hz. This state of increased physiological coherence is characterized by increased parasympathetic activity, increased vascular resonance, and improved sympathovagal balance, and is also generally accompanied by enhanced emotional balance and mental clarity.

In conclusion, results indicate that music can be designed to potentiate the immunoenhancing effects of positive emotional states. The data, combined with previous findings, suggest that these effects are likely to be autonomically mediated and facilitated by increased physiological coherence. This study suggests that the use of music in conjunction with effective techniques for emotional self-management can be a practical, inexpensive and non-invasive method to enhance immunity. Such interventions may yield significant health benefits both in healthy individuals and in a variety of clinical conditions in which there is immunosuppression and autonomic imbalance.