



MUSICOGENETICS: A NEW SPECIALTY ON HORIZON?

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Advances in fields of genetics and molecular biology have changed approach to health and diseases in human beings. Genes are known to affect the health directly by being in causation/predisposing relationship with specific medical condition(s). In addition to direct gene-disease relationship, gene also affect overall medical management of a patient by increasing one's susceptibility for or resistance to certain drugs and drug interactions, and by increasing or decreasing probabilities of drug tolerance or intolerance – pharmacogenetics has wide applications in practice of medicine. Beyond drugs and diseases, genes start play their role right from formation of an embryo – from synthesis of organ systems, to functioning of organs, to altering thoughts and emotions, to affecting health-related behavior, etc. Concept of medical treatment guided by genetic constitution of a patient seems promising and rational. ¹.

Over last a few decades, interest in music therapy has grown globally. Music therapy has found its applications in areas of psychiatry, psychology, neurology, oncology, anesthesiology, intensive care, obstetrics, pediatrics, geriatrics, palliative care, etc ². On one side, reciprocal relationship between effects of music on brain and effects of music behavior on brain function seems to hold a strong potential to see music therapy as an important treatment modality in therapeutics in future³, researches in psycho-neuro-endocrino-immunology also point towards irrefutable importance of stress regulation and healthy behaviors in management of many common diseases ⁴. As human physiology and pathology are influenced by genes parallelly, we

believe that there is a wide scope for research in field of “musicogenetics” – a term coined by us to describe a specialized field of bioscience to study interactions between human genes, music traits, music behavior, and music therapy responses.

Till date, we have studied that roots of musicality is an expression of musical self and that neuroscience and psychobiology have identified the potential of musical expressions to bring about therapeutic change in music therapy⁵. Also studies have indicated a link between the felt quality in musical expression with the psychosomatic aspects, emotions and thought patterns and the deeper needs of the clients/patients ⁶.

Researchers have also studied relationship between genes and music traits. Based on research so far, it is rational to think of genetic basis of individual differences in musicality – music perception, music memory, music listening, music production, singing, and music creativity. Genes AVPR1A on chromosome 12q and SLC6A4 on chromosome 17q have been associated with music memory; AVPR1A and SLC6A4 have been also implicated in music perception-music listening and choir perception respectively. Several loci on chromosome 4 are associated with music perception and singing, while certain loci on chromosome 8q have been implicated in music perception and absolute pitch. ^{7,8}. Recently, a study by Kanduri C et al has shown up-regulation and down-regulation of several genes following listening to music ⁹. However, much more research is needed in “musicogenetics” and there is no study in this field that would help to apply knowledge of genetics in field of music therapy.

As music therapists and researchers, we have tried to identify several unanswered questions and we would like to briefly summarize them as follows:

a. Are there genes that predict a therapeutic response or failure to music therapy? If yes, are genes associated with music therapy response same as or different from those associated with music traits? b. Is congenital amusia^{8, 10} related to ineffectiveness of music therapy? c. In patients with multi-gene disorders, are there specific genes that would predict high probability of effectiveness of music therapy? d. Can music therapy affect gene expression via epigenetic mechanisms? Of course, these are very basic questions, and further questions are likely to arise when these questions would be answered.

Answers to these questions are likely to reveal links between genetic constitution, a “personal map” of every individual, determinants of musicality and of music therapy; such discoveries would definitely help health care providers and therapists to provide music therapy in a more personalized way and more effectively.

Musicogenetics appears to be an emerging specialized field that should discover some interesting truths. It is apparent that research in this field requires dedicated and integrated efforts from geneticists, music therapists, psychologists, physicians, and allied health care professionals. Of course, such efforts have a great potential to understand gene-mind-body interactions better, to alter management of several medical conditions, and to influence clinical practice.

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