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Editorial Note on Alternative & Integrative Medicine - Neurogenetics

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Introduction

Neurogenetics studies the part of hereditary qualities in the advancement and capacity of the sensory system. It considers neural qualities as phenotypes and is chiefly taking into account the perception that the sensory systems of people, even of those fitting in with the same species, may not be indistinguishable. Neurogenetics cluster supports research of genes that cause neurological disorders; molecular mechanisms through which disease genes act; animal models and in vitro techniques for studying pathways of gene function; genetically-based studies of neuronal patterning, migration, connectivity, and cognitive/behavioral function; and the genetic basis of normal neural development and function

Neurogenetics studies the role of genetics in the development and function of the nervous system. It considers neural characteristics as phenotypes (i.e. manifestations, measurable or not, of the genetic make-up of an individual), and is mainly based on the observation that the nervous systems of individuals, even of those belonging to the same species, may not be identical. As the name implies, it draws aspects from both the studies of neuroscience and genetics, focusing in particular how the genetic code an organism carries affects its expressed traits. Mutations in this genetic sequence can have a wide range of effects on the quality of life of the individual. Neurological diseases, behavior and personality are all studied in the context of neurogenetics. The field of neurogenetics emerged in the mid to late 1900s with advances closely following advancements made in available technology. Currently, neurogenetics is the center of much research utilizing cutting edge techniques

The field of neurogenetics emerged from advances made in molecular biology, genetics and a desire to understand the link between genes, behavior, the brain, and neurological disorders and diseases. The field started to expand in the 1960s through the research of Seymour Benzer, considered by some to be the father of neurogenetics.

Seymour Benzer in his office at Caltech in 1974 with a big model of Drosophila

His pioneering work with Drosophila helped to elucidate the link between circadian rhythms and genes, which led to further investigations into other behavior traits. He also started conducting research in neurodegeneration in fruit flies in an attempt to discover ways to suppress neurological diseases in humans. Many of the techniques he used and conclusions he drew would drive the field forward.

Early analysis relied on statistical interpretation through processes such as LOD (logarithm of odds) scores of pedigrees and other observational methods such as affected sib-pairs, which looks at phenotype and IBD (identity by descent) configuration. Many of the disorders studied early on including Alzheimer's, Huntington's and amyotrophic lateral sclerosis (ALS) are still at the center of much research to this day. By the late 1980s new advances in genetics such as recombinant DNA technology and reverse genetics allowed for the broader use of DNA polymorphisms to test for linkage between DNA and gene defects. This process is referred to sometimes as linkage analysis. By the 1990s ever advancing technology had made genetic analysis more feasible and available. This decade saw a marked increase in identifying the specific role genes played in relation to neurological disorders. Advancements were made in but not limited to: Fragile X syndrome, Alzheimer's, Parkinson's, epilepsy and ALS.

While the genetic basis of simple diseases and disorders has been accurately pinpointed, the genetics behind more complex, neurological disorders is still a source of ongoing research. New developments such as the genome wide association studies (GWAS) have brought vast new resources within grasp. With this new information genetic variability within the human population and possibly linked diseases can be more readily discerned. Neurodegenerative diseases are a more common subset of neurological disorders, with examples being Alzheimer's disease and Parkinson's disease. Currently no viable treatments exist that actually reverse the progression of neurodegenerative diseases; however, neurogenetics is emerging as one field that might yield a causative connection. The discovery of linkages could then lead to therapeutic drugs, which could reverse brain degeneration.

One of the most noticeable results of further research into neurogenetics is a greater knowledge of gene loci that show linkage to neurological diseases. The table below represents a sampling of specific gene locations identified to play a role in selected neurological diseases based on prevalence in the United States.

Related Journals of Neurogenetics

Alternative Health Care Journals, Alternative Medicine Journals, Journal of Neurological Sciences, Journal of Neuroscience, Neurogenetics.

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