DOWNLOAD PDF GENETICS OF MOVEMENT DISORDERS

Chapter 1 : Movement disorders - Wikipedia

Describing the current knowledge on these disorders, Genetics of Movement Disorders brings together information essential for clinicians, geneticists, and neuroscientists in one source. Utilizing a convenient and accessible format, the book is designed to allow easy identification of relevant information, with the overall organization of topics.

Publications Definition Psychogenic movement is an unwanted muscle movement such as a spasm or tremor that is caused by an underlying psychological condition. Psychogenic movement can involve any part of the body and resemble the same muscle movements that occur with a biological condition or structural abnormality. Most psychogenic movement is involuntaryâ€”done without being consciously initiated by the individual. Unlike movement disorders caused by biological or structural conditions, psychogenic movement disorders commonly develop suddenly, progress rapidly to maximum severity, may increase in intensity, and come and go with complete or partial remissions. The movement may be less when the person is distracted, and the severity of symptoms varies among individuals. The course of the psychological condition may be short-lived or lead to chronic disability. Psychogenic movement is uncommon before the age of 10 years. In children, the dominant limb is most often affected, while adults most frequently see movement in the nondominant limb. Psychogenic movement disorders include: Many individuals with psychogenic tremor have a conversion disorder. Onset may be abrupt or appear as part of a recurring attack. Psychogenic dystonia typically involves fixed postures, particularly from the start, whereas dystonia caused by a muscle or structural abnormality tends to involve more mobility and be action induced. Myoclonic jerks may occur alone or in sequence, in a pattern or without pattern. Increased startle or startle-like movements are frequent. Psychogenic myoclonus may occur spontaneously or be generated by an action or reflex. The twitching cannot be controlled by the person experiencing it. Individuals with psychogenic parkinsonism may also have tremor. Symptoms are usually seen on both sides of the body. Individuals may stagger or veer from side to side when walking and appear to be losing their balance, but only rarely fall. Sudden knee buckling without falling is common. View Full Definition Treatment No single test can confirm psychogenic movement, which can prove difficult to diagnose. Physicians must rule out co-existing conditions and other recognizable movement disorders. There may be fluctuations during a neurological examâ€”particularly an increase of movement following attention and suggestion an external influence on the will of the patient , and a decrease when the person is distracted. Electroencephalography EEG can correlate the movement and detect any changes in electrical activity patterns produced by the brain. Physicians also look for marked improvement in symptoms following psychotherapy, use of a placebo a medicine with no specific pharmacological benefit for the disorder being treated but given to see if it produces psychological or physical benefits , or suggestion. View Full Treatment Information Definition Psychogenic movement is an unwanted muscle movement such as a spasm or tremor that is caused by an underlying psychological condition. Treatment No single test can confirm psychogenic movement, which can prove difficult to diagnose. Prognosis The severity of psychogenic movement symptoms and prognosis varies among individuals. Prognosis is considered poor when the movement disorder continues for many years. Outcome appears to be better in younger people with a shorter duration of symptoms than in older persons with more chronic symptoms. Also, people with few and mild symptoms that have an acute onset tend to have a more favorable outcome, particularly if the duration of symptoms is relatively short and is preceded by a stressful or traumatic event. Some individuals may continue to experience symptoms over time and develop new symptoms related to other parts of their body.

Chapter 2 : Movement Disorders - Department of Neurology - Mayo Clinic Research

Because the genetics of movement disorders are complex, genetic testing results determining the clinical diagnosis can only be recommended for genes that are unequivocally disease causing. However, gene panel testing is slowly transitioning into clinical utility, heralding the transition of movement disorder genetics from bench to bedside.

Genetic Research What is Genetic Research? Unfortunately we have not yet identified all the genes that cause inherited movement disorders and there are many movement disorders for which a genetic test is not yet available. We need to continue our efforts working with families affected with inherited movement disorders to discover new genes and develop new tests. Most genetic research efforts involve the participation of affected individuals and, if applicable and available , their affected or unaffected family members. Study participation typically requires a single visit of approximately one hour, and usually involves a blood draw for DNA analysis , a neurological exam, questionnaires on family and medical history and video-taping. All genetic research at Columbia University is approved by the institutional review board IRB and requires the reading and signing of consent forms. The IRB is a committee organized to protect the rights and welfare of human subjects involved in research. There are major differences between clinical genetic testing and genetic research. These are summarized in the table below: Differences and similarities between clinical genetic testing and genetic research The Division of Movement Disorders is involved in the following on-site research: For more information about young-onset PD genetic research onset of motor symptoms at age 50 years or less call Helen Mejia Santana on If you have PD and all four of your grandparents are of Ashkenazi Jewish ancestry, you may be eligible for a new study looking at risk factors for PD in this population. Please contact Jill Goldman at ET is the most common form of tremor. There are familial and non-familial forms of ET and a number of autosomal dominant families have been described. If you are interested in participating in ET research studies and you are 18 years or older, please contact Eileen Rios at The Division of Movement Disorders is also collaborating with outside sites on a number of studies listed below. To participate in the research below, you must already be a patient at the Division of Movement Disorders. A brief summary of the research for each condition is given. Ataxia is a form of incoordination that can occur as part of a constellation of symptoms caused by neurodegeneration of the cerebellar. It can also be part of a syndrome. There are genetic familial and non-genetic forms of ataxia. Over 10 genes associated with ataxia have already been identified. There are many forms of familial ataxia for which the genetics is not yet understood. There are a number of genetic diseases, which have chorea involuntary movements of the head, trunk and limbs as a component. Although we know the genetic cause of Huntington disease and Huntington disease-Like 2, there are other similar familial diseases for which we do not yet understand the genetic basis. Dystonia refers to twisting movements that are frequently repetitive, and often progress to prolonged abnormal postures. The genetic basis of one form of early-onset torsion dystonia DYT1 , dopa-responsive dystonia and myoclonus dystonia is known. However we do not yet understand the genetics of other forms of familial dystonias. The adult-onset focal dystonias for example dystonia affecting the neck or eyes are thought to be caused by a combination of genetic and non-genetic factors. Researchers are looking for these genetic factors. These movements are characterized by transient symptoms of varying frequency, severity, duration and aggravating factors. They can be induced by movement or by factors other than movement such as caffeine or stress. Most familial forms of the paroxysmal dyskinesias are autosomal dominant. A number of sites on chromosomes 1, 2 and 16 are thought to contain genes that cause this group of disorders. TS is characterized by motor and phonic tics and behavioral symptoms. TS is usually familial and is often accompanied by attention-deficit hyperactivity disorder ADHD , obsessive-compulsive disorder OCD and other behavioral problems. Researchers are trying to find the genes that cause TS. Please contact Jill Goldman at for more information about our collaborative research efforts for ataxia, chorea, dystonia, paroxysmal dyskinesia and Tourette syndrome. American Journal of Human Genetics. Archives of Neurology Mar;62 3: Levy, G, Louis, E. Marder, K, Levy, G. Annals of Neurology Nov;56 5: Neurol; 52 2 ; Apathy and Psychosis in early vs. Annals of Neurology Clark, L. The American Journal of Human Genetics. S73 Hedrich K. Recurrent mutations in the

parkin gene. The Society for Neuroscience Hedrich, K. Neurology 56 suppl 3 A Clinical phenotypes associated with a genetic susceptibility to PD. A, Ozelius, L.

Chapter 3 : Genetic Research | Columbia University Department of Neurology

Hereditary or genetic diseases featuring involuntary movements constitute a major aspect of the practice of neurology, functional neurosurgery, genetics, and many areas of basic and applied neuroscience research.

Ataxia Ataxia is a degenerative disorder affecting the brain, brainstem or spinal cord. This can result in clumsiness, inaccuracy, instability, imbalance, tremor or a lack of coordination while performing voluntary movements. Movements are not smooth and may appear disjointed or jerky. Patients may fall down frequently due to an unsteady gait. Ataxia also can affect speech and movement of the eyes. If a metabolic disorder can be identified as the underlying cause, specific treatment may be available in select cases. The cornerstone of treatment for ataxia of parkinsonism or parkinsonism of any cause is the use of oral L-DOPA. Other medications used to treat ataxia associated with parkinsonism or parkinsonism of any cause include anticholinergics , dopamine agonists , amantadine , selegiline and entacapone. In children with ataxia, generally only anticholinergics are prescribed. Dystonia Dystonia is a neurological muscle disorder characterized by involuntary muscle spasms. Dystonia results from abnormal functioning of the basal ganglia , a deep part of the brain which helps control coordination of movement. These regions of the brain control the speed and fluidity of movement and prevent unwanted movements. Patients with dystonia may experience uncontrollable twisting, repetitive movements or abnormal postures and positions. These can affect any part of the body, including the arms, legs, trunk, eyelids and vocal cords. General dystonias involves the entire body. Depending on what part of the body is affected, the condition can be very disabling. There is a three-tiered approach to treating dystonia: These may be used alone or in combination. Botox injections help block the communication between the nerve and the muscle and may lessen abnormal movements and postures. Surgery is considered when other treatments have proven ineffective. The goal of surgery is to interrupt the pathways responsible for the abnormal movements at various levels of the nervous system. Some operations purposely damage small regions of the thalamus thalamotomy , globus pallidus pallidotomy or other deep centers in the brain. Recently, deep brain stimulation DBS has been tried with some success. Other surgeries include cutting nerves leading to the nerve roots deep in the neck close to the spinal cord anterior cervical rhizotomy or removing the nerves at the point they enter the contracting muscles selective peripheral denervation. Essential Tremor Essential tremor is an uncontrolled shaking or trembling, usually of one or both hands or arms, that worsens when basic movements are attempted. Essential tremor affects about five million people in the U. National Library of Medicine, essential tremors are found most commonly in adults over the age of It is caused by abnormalities in areas of the brain that control movement and is not tied to an underlying disease e. About 50 percent of patients have a family history of the condition. This condition usually does not result in serious complications, but it certainly can interfere with daily activities and cause distress. In some cases, physical therapy or changes in lifestyle may improve symptoms. About 50 to 75 percent of patients taking medications have a reduction of their tremor. Beta-blockers , anti-seizure medications , benzodiazepines and carbonic anhydrase inhibitors often are prescribed. Beta-blockers usually are prescribed for younger patients because they may cause memory loss and confusion in older patients. Botox injections help block the communication between the nerve and the muscle and may lessen tremor. If the tremor is so severe that is causes a disability, surgery may be recommended. Thalamotomy purposely destroys a portion of the area deep within the brain that receives sensory messages, and area known as the thalamus. About 75 percent of patients undergoing this procedure find relief on one side of their body. Surgery on both sides of the thalamus is rarely done due to the high risk of speech loss. Deep Brain Stimulation is another surgical option in severe cases of essential tremor that have not responded to medication. A hair-thin wire is implanted in the thalamus and connected to a neurostimulator implanted under the collarbone. The neurostimulator sends electrical impulses along the wire to the thalamus, interrupting signals that cause tremor. Onset most often occurs between ages 35 and 50, with the condition progressing without remission over 10 to 25 years. A juvenile form of the disease affects patients age 20 and younger, accounting for about 16 percent of all cases. Symptoms include jerking; uncontrollable movements of the limbs, trunk, and face; progressive loss of mental abilities; and the

development of psychiatric problems. Doctors may prescribe antipsychotics, antidepressants , tranquilizers , mood-stabilizers or botox injections. These are prescribed in the lowest effective dosage, as all of these medications may have side effects. Researchers have observed that the earlier in life the symptoms occur, the faster the disease often progresses. Because symptoms, onset and severity of MSA vary from person to person, differing ranges of symptoms were designated initially as three different diseases: Shy-Drager syndrome , striatonigral degeneration and olivopontocerebellar atrophy. All of these now are classified under MSA. Symptoms include stiffness or rigidity; freezing or slowed movements; instability; loss of balance; loss of coordination; a significant fall in blood pressure when standing, causing dizziness, lightheadedness, fainting or blurred vision orthostatic hypotension ; male impotence ; urinary difficulties ; constipation ; and speech and swallowing difficulties. Medication may be prescribed to treat some of the symptoms associated with this disease. Orthostatic hypotension can be improved by prescribing drugs that raise blood pressure. As MSA progresses, the benefits of medication lessen. In cases that have progressed and are more severe, a feeding tube may be needed when the patient cannot swallow food on his or her own. Myoclonus Myoclonus is a twitching or intermittent spasm of a muscle or group of muscles. Myoclonus is classified into several major types and many subcategories. The most common type is cortical myoclonus, which arises from an area of the brain known as the sensorimotor cortex. Jerky movements usually have a regular rhythm and may be limited to one muscle or muscle group focal or several different muscle groups multifocal. They may occur without an obvious cause or be a result of many diseases. Subcortical myoclonus usually affects many muscle groups generalized and may be the result of abnormally low levels of oxygen in the brain hypoxia or a metabolic process, such as kidney or liver failure. Spinal myoclonus usually is caused by a focal spinal lesion, such as multiple sclerosis , syringomyelia , trauma, ischemic myelopathy or an infection such as herpes zoster , Lyme disease , E. The jerking often lasts longer and is more variable than in cortical or subcortical myoclonus and continues during sleep. The most common type of peripheral myoclonus is hemifacial spasm , which may occur for no underlying reason or be caused by compression of the facial nerve. Movements persist during sleep and may last for only a few days or for as long as a few months. The exact type of myoclonus is delineated further by the parts of the body affected and by the underlying causes. Myoclonus is treated through prescribing medications that may help reduce symptoms. In some cases, effective results are achieved by combining multiple drugs. Some of the medications prescribed are barbiturates , phenytoin , primidone , sodium valproate and the tranquilizer clonazepam. All of these medications have potential side effects, so it is very important for patients to work closely with their doctor on medication management. These nerve cells die or become impaired, losing the ability to produce an important chemical called dopamine. Some common medications used are dopamine precursors, dopamine agonists and anticholinergics. Surgery is considered when medications have proven ineffective. Thalamotomy can help stop tremor by placing a small lesion in a specific nucleus of the thalamus. People with PSP experience a gradual loss of specific brain cells, causing slowing of movement and reduced control of walking, balance, swallowing, speech and eye movement. Often, there are personality and cognitive changes, causing emotional outbursts and a decrease in intellectual abilities. This disease more commonly affects people ages 40 to 60 and usually runs its full terminal course in six to 10 years. While the cause of PSP is unknown, researchers know that a brain protein called tau accumulates in abnormal clumps in certain brain cells in people with PSP, causing the cells to die. There appears to be a genetic predisposition. Unfortunately, there is no effective medication to treat PSP, but research is ongoing. Medications that may have a slight benefit are levodopa, amantadine and amitriptyline. Botox injections may be used to treat the blepharospasm involuntary eyelid closure that occurs in some people with PSP. Rett Syndrome Rett Syndrome is a progressive neurological disorder that causes debilitating symptoms, including reduced muscle tone , autistic-like behavior , repetitive hand movements, irregular breathing, decreased ability to express feelings, developmental delays in brain and head growth, gait abnormalities and seizures. Loss of muscle tone usually is the first symptom. According to the International Rett Syndrome Foundation , about one in every 10, to 23, infant girls is diagnosed with Rett, but the prevalence may be much higher due to undiagnosed cases. Rett can affect boys, but they account for a very small percentage of cases. Children with Rett appear to develop normally until six to 18 months of age, at

which point symptoms start to appear. Rett leaves its victims profoundly disabled, requiring maximum assistance with all aspects of daily living. Unfortunately, there is no cure for Rett. Treatment for the disorder focuses on the management of symptoms and requires a supportive, multidisciplinary approach. The disorder progresses through four major stages, each with characteristic symptoms and medical implications. Medication may be needed for breathing irregularities and motor difficulties. Antiepileptic drugs may be used to control seizures. Occupational therapy , education and supportive services are geared towards helping individuals with Rett cope with daily challenges and maintain a quality of life. Although it is severely debilitating, individuals with Rett have lived to middle age, but rarely beyond ages 40 to Many of the medications used to treat this condition have potential side effects, so it is very important to work closely with your doctor on medication management. Spasticity Spasticity is increased muscle contractions causing stiffness or tightness of the muscles that may interfere with movement, speech and walking. Spasticity usually is caused by damage to the portion of the brain or spinal cord that controls voluntary movement.

Chapter 4 : Huntington's disease - Symptoms and causes - Mayo Clinic

The results of a genetic test can confirm or rule out a suspected genetic condition, or help determine a person's chance of developing or passing on a genetic disorder. Understanding these results also helps researchers develop therapies to better treat diseases like movement disorders.

Part of the disease process develops as cells are destroyed in certain parts of the brain stem, particularly the substantia nigra. Nerve cells in the substantia nigra send out fibers to tissue located in both sides of the brain. There the cells release essential neurotransmitters that help control movement and coordination. These are complex disorders with genetic and environmental factors contributing to their cause. Movement disorders can be divided into two groups: One of the most common movement disorders is essential tremor, which is commonly familial and results in shaking of the hands, head, and voice. While there are some clinical differences, often the only way to make a definitive diagnosis is by autopsy of the brain. Mayo Clinic neurologists in Arizona, Jacksonville, and Rochester are conducting research investigating many movement disorders. Research is aimed at determining the cause for these disorders as well as finding new treatments that will improve symptoms and eventually slow or stop the progression of these disorders. The continual interaction of individuals and research teams and labs reflects the rapid and constant evolution of research in the field of neuroscience and constitutes an extraordinary strength that we believe is a model for medical research on any disease. Our research is a reflection of the unique collaboration and multidisciplinary work done at Mayo Clinic. Below is a sampling of some of the current projects and achievements. The studies will use current work and preliminary findings, along with a control group of cases of PD referred to the Mayo Clinic from a mile radius or from a five-state region and controls free of PD and parkinsonism. The first is a historical cohort study to test the association between unilateral and bilateral oophorectomy before menopause and PD in an established population-based cohort. The study will include over 2, women who underwent oophorectomy and a corresponding group of women of the same age and residence who did not undergo oophorectomy. A second historical cohort study will test the association between personality traits measured by the Minnesota Multiphasic Personality Inventory MMPI and PD in an established research cohort. The proposed case-control study is strong because it has adequate statistical power to confirm preliminary findings on the role of estrogen in PD and to explore the link between substance use and novelty seeking behaviors in PD. These studies will contribute greatly to understanding the causes and possible prevention of PD by exploring novel hypotheses and by using innovative methods. Treatment will be given orally for twenty weeks with follow-up lasting up to twenty-four weeks there is a two- to three-week screening period before treatment begins. Safety and efficacy will be monitored at multiple scheduled visits. This is a phase 3 study sponsored by Eisai Medical Research, Inc. The primary objective of this study is to compare the efficacy of certain doses of E and a placebo in patients with PD who experience end-of-dose "wearing off" fluctuations in their motor function. Patient diaries will serve as the primary efficacy measure. This feasibility study is an indispensable step toward the development of fluorodopa positron emission tomography PET as a screening tool for preclinical detection in at risk family members. The study will have three major goals: Fox Foundation Edmond J. Safra Global Genetics Consortia Program. The consortium has since increased in size to represent multiple investigators from thirty-one sites, twenty countries, and six continents. By October 31, , it is projected that the sites will have data and DNA available for more than 20, cases and 20, controls. New members are actively sought for these and future projects, which will focus on genetic association studies of PD. Investigators are required to have data and DNA available for a minimum of PD cases and unrelated controls, and to be willing to share small aliquots of DNA from a small sub-sample for genotyping reliability studies. The APDC focuses on investigation into the causes and diagnosis of PD and dementia in PD, as well as formulation of cures and new treatments, including drug discovery and development that may ultimately lead to prevention, better treatments, and a cure for the disease. However, the only way to definitively diagnose PD is by autopsy. In addition to being a disorder of movement, thirty to seventy-five percent of patients with PD develop dementia which can be very disabling. While there are treatments medications and

surgical procedures that improve the motor symptoms, there are no treatments that slow or halt disease progression or prevent dementia in PD patients. Unfortunately, the underlying cause of PD and of dementia in PD is unknown. Currently there are living subjects enrolled, and over brains have been collected. Participants are evaluated annually by a movement disorders specialist, a behavioral neurologist, and a neuropsychologist looking for signs of PD and dementia. The major goal is to find the earliest clinical markers for the onset of PD and for the onset of dementia in people with PD so that studies of treatments to slow or stop these disorders can be started earlier. One of the critical features of the program is the confirmation of the clinical diagnosis by autopsy. A comprehensive longitudinal database has been established employing validated examination ratings in more that 4, patient visits over ten years. He and his research team are actively comparing phenotypes between genetic and sporadic forms of parkinsonism. Additional areas of research focus Charles Adler, M. Another area of research is Dr. Adler and John N. This study is in collaboration with researchers at Arizona State University. Some golfers complain of an involuntary movement while making a putt, and this is known as the yips. The research is comparing golfers who complain of the yips with golfers that do not complain of this. The goal of the research is to determine if some of the subjects with the yips have an involuntary movement disorder such as tremor or dystonia. More about research at Mayo Clinic.

Chapter 5 : Athena Diagnostics - Movement Disorders

Genetics of Movement Disorders by Stefan M. Pulst Hereditary or genetic diseases featuring involuntary movements constitute a major aspect of the practice of neurology, functional neurosurgery, genetics, and many areas of basic and applied neuroscience research.

Chapter 6 : Psychogenic Movement Information Page | National Institute of Neurological Disorders and Str

Movement disorders are a class of neurologic disease in which abnormalities of movement are the primary symptom. This may involve either the lack or slowness of movement (hypokinetic movement disorders) or increased or extra movements (hyperkinetic movement disorders).

Chapter 7 : What are movement disorders? | Genetic Disorders - Sharecare

The primary NIH organization for research on Movement Disorders is the National Institute of Neurological Disorders and Stroke Disclaimers MedlinePlus links to health information from the National Institutes of Health and other federal government agencies.

Chapter 8 : Movement Disorders â€“ Classifications, Symptoms and Treatments

This study will perform genetic testing to identify the genetic causes of movement disorders and dementia. Today, genetic testing can be done to analyze multiple genes at the same time. This increases the chances of finding the genetic cause of movement disorders and dementias.

Chapter 9 : Genetics of Movement Disorders â€” University of Utah

Movement disorders can be divided into two groups: those that result in too much movement and those that result in slowness or too little movement. One of the most common movement disorders is essential tremor, which is commonly familial and results in shaking of the hands, head, and voice.