Dystrophia Myotonica 1

Alternative Names
DM1
Dystrophia Myotonica
DM
Myotonic Dystrophy 1
Steinert Disease
Steinert Myotonic Dystrophy

WHO International Classification of Diseases
Diseases of the nervous system

OMIM Number
160900

Mode of Inheritance
Autosomal Dominant

Gene Map Locus
19q13.2-q13.3

Description
Myotonic dystrophy 1 is the most common inherited neuromuscular disease in adults, with an incidence of 1 in 8500. The dominantly inherited disorder shows a very wide range of presentations and progressions, from the adult onset form, which typically presents with distal dystrophy and myotonia after 20 years of age. The disease is progressive and often leads to significant disability. Characteristic facial changes are also common: low-set ears, a hatchet chin and drooping of the lips and ptosis. Severe cases of adult-onset myotonic dystrophy also show a high incidence of presenile cataracts, testicular atrophy, diabetes, kidney failure and early frontal balding in males. Mental retardation and ‘difficult’ personalities can also be seen.

Molecular Genetics
Myotonic dystrophy 1 is caused by the expansion of an unstable CTG repeat located in the 3’ untranslated region of the dystrophia myotonica protein kinase gene, DMPK, on 19q13.3. The myotonic dystrophy 1 gene is 14 kb and encodes 2.3 kb of mRNA with 15 exons and a protein of 624 amino acids. The consequence of the repeat expansion includes abnormal splicing and transport of DMPK transcripts, which result in a decrease in DMPK protein levels and sequestration or induction of RNA-binding proteins by transcribed, expanded CUG repeats. In addition, the repeat lies immediately 5’ to the regulatory region of the homeobox gene SIX5, and repeat expansion causes the loss of a DNase I-hypersensitive site in the region and suppression of SIX5 expression.

Epidemiology in the Arab World

Egypt
Cattaino and Vicario (1999) studied the pictures of Akhenaton, a heretical pharaoh, king of the New Kingdom of Ancient Egypt, (the mummy has not yet been found). Statues and reliefs of him showed an unhealthy man whose body has abnormal features. Cattaino and Vicario (1999) concluded that he may have been affected by myotonic dystrophy. The similarity in the clinical appearance of the members of the royal family suggests a disease with autosomal dominant inheritance. Moreover, Cattaino and Vicario suggested that myotonic dystrophy may have caused the end of the royal bloodline of the Eighteenth Dynasty.

Palestine
In 1997, Mor-Cohen el al. conducted a study of the CTG repeat polymorphism in 106 Muslim Arabs from Palestine and 103 Yemenite Jews. Alleles were studied by PCR analysis of the trinucleotide repeat in the dystrophia myotonica gene. The alleles ranged in length from 5-26. The most common allele had 5 repeats in 50.2% of Muslim Arabs. Most of the remaining alleles were in the range of 11-13 repeats (31.8%). Mor-Cohen el al. (1997) suggested that the more frequent occurrence of large CTG repeats
in the normal range may represent a greater predisposition to dystrophia myotonica [See also: Yemen > Mor-Cohen et al. 1997].

**United Arab Emirates**

Anwar et al. (1986) reported a rare condition of dystrophia myotonica presenting as a case of infertility in a 35 year old Emirati male. Striking facial feature upon medical investigation were the characteristic appearance of a long and haggard face with bilateral partial ptosis, atrophy of the temporalis and masseter muscles, atrophy of the sternomastoids, and premature frontal baldness. Distal muscular weakness of both upper and lower limbs together with a characteristic myotonia was also noted. Electromyogram revealed increased insertional activities with frequent fibrillations and myotonic discharges. Hormonal assays reflected primary gonadal failure and formal glucose tolerance test showed typical diabetic curve. Testicular biopsy showed marked testicular atrophy.

**Yemen**

In 1997, Mor-Cohen et al. conducted a study of the CTG repeat polymorphism in 103 Yemenite Jews. Alleles were studied by PCR analysis of the trinucleotide repeat in the dystrophia myotonica gene. The alleles ranged in length from 5-28 repeats in the and the most common allele had 5 repeats in 33.8% of Yemenite Jews. Most of the remaining alleles were in the range of 11-13 repeats (35.7%). Mor-Cohen et al. (1997) indicated that allele distribution in Muslim Arabs from Palestine was significantly different from that in Yemenite Jews using only the 19 repeats as the cutoff point. Mor-Cohen et al. (1997) suggested that the more frequent occurrence of large CTG repeats in the normal range may induce particular susceptibility to expansion to the mutation range in dystrophia myotonica.

**References**


**Contributors**

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