

## **Ullrich congenital muscular dystrophy**

### **What is Ullrich congenital muscular dystrophy?**

The congenital muscular dystrophies are a group of conditions which share early presentation and a similar appearance of the muscle. Congenital means 'from birth' and in congenital muscular dystrophy the initial symptoms are present at birth or in the first few months. Congenital muscular dystrophies are a very heterogeneous group of conditions and in the last few years a lot of effort has gone into identifying the separate entities and in locating the genes responsible for a number of these forms.

Ullrich congenital muscular dystrophy (UCMD) is a form of congenital muscular dystrophy with specific features:

- children are often double jointed in their hands and feet but have some tightness in other joints such as elbows or hips
- they have rigidity (stiffness) of the spine
- children tend to develop respiratory problems, which result in frequent chest infections and might require ventilatory support at night

The genes responsible for Ullrich congenital muscular dystrophy have recently been identified and lie on chromosomes 21 and 2. These 3 genes are responsible for the production of the protein collagen VI.

### **Which are the first signs?**

Babies with UCMD often have hypotonia (low muscle tone or floppiness), and may have reduced movements. Other common signs are hip dislocation and a stiff neck (torticollis) and contractures (tightness) in the hips, knees and elbows. Some of these babies may also have feeding problems, which improve after a few weeks or months.

Sometimes the first signs are only noted after a few months when babies are observed to have poor head control or have a delay in learning new skills such as sitting unaided, crawling or walking.

### **Is UCMD Inherited?**

Yes. The pattern of inheritance is known as 'autosomal recessive'. This means that both parents are carriers of the condition (although clinically unaffected) and they have risk of 25%, or 1 in 4, in each pregnancy of passing the condition on to their children. Occasionally a case may be 'sporadic' which means is a one-off with little risk of recurrence in other children. However, the risk of recurrence in the offspring of these sporadic cases can be significant. All families with UCMD should be referred for genetic counselling.

### How is UCMD diagnosed?

The diagnosis of UCMD is usually suspected from the history and examination. The specific diagnosis however is generally made by looking at a piece of muscle or skin (muscle and skin biopsy).

Before doing a muscle biopsy (which involves taking out a small piece of muscle, usually from the thigh) a few other tests may be done. One of these tests is a **blood test** which measures the level of a muscle protein (creatine kinase or CK) that however is generally only mildly raised.

**Muscle ultrasound** may also help to detect abnormalities in the muscle. The technique is very simple, similar to the ultrasound studies carried out in pregnancy and may provide further evidence of the involvement of the muscle.

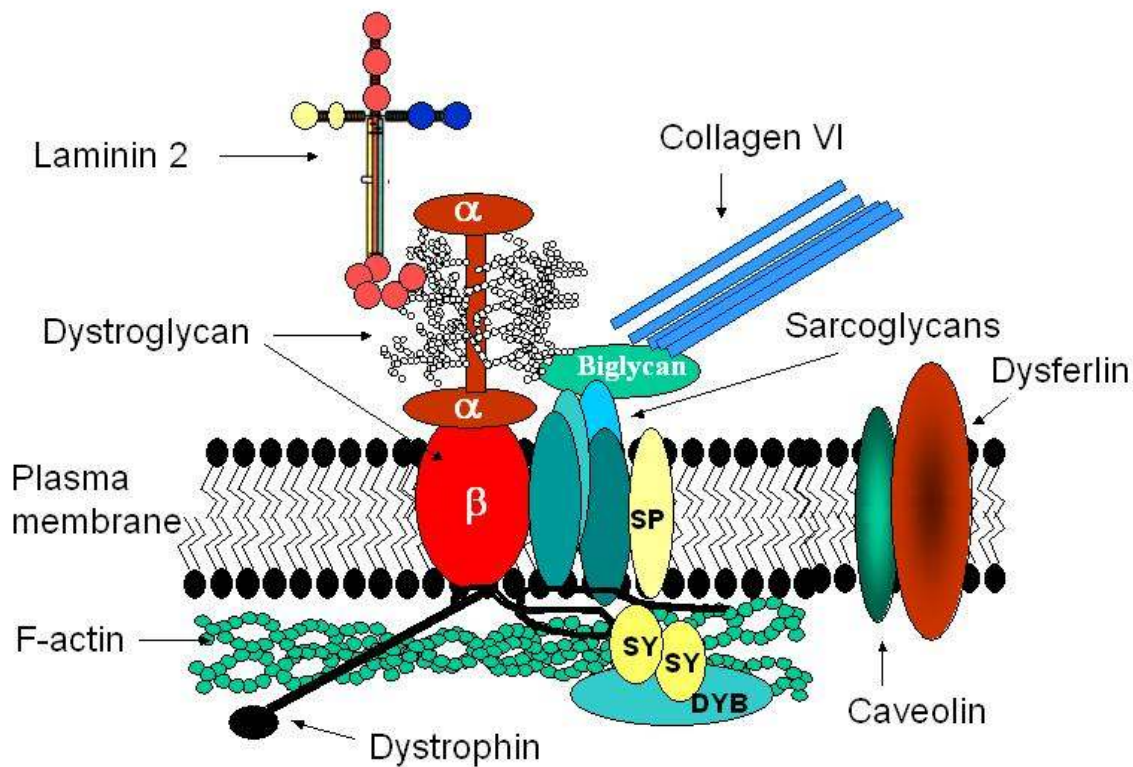
These tests provide a broad indication that there is a muscle problem but cannot pin-point the precise diagnosis.

**Muscle biopsy** can provide a precise diagnosis in two ways:

- When the muscle is studied under the microscope, it is possible to look for signs, which might indicate a muscle problem. In children with a muscular dystrophy the muscle fibres, instead of being evenly sized, show a great variation and some of these fibres are replaced by fat and fibrous tissue.
- It is also possible to look at the presence of collagen VI in the muscle under the microscope. There are specific 'tags' which can interact with collagen VI and detect whether collagen VI is normally present or reduced. A reduction in collagen VI in a patient with evocative clinical features strongly suggests the possibility of Ullrich congenital muscular dystrophy.

As collagen VI is normally present both in muscle and skin, taking a small piece of skin (**skin biopsy**) can also help to confirm the diagnosis. In some cases it is easier to detect a reduction of collagen VI on skin cells than on muscle cells. Taking a piece of skin however cannot provide some of the information that one can achieve with a muscle biopsy and it is therefore important to have both muscle and skin biopsies to obtain all the information needed.

The illustration overleaf shows where collagen VI is produced in the muscle fibres. In the upper part of the illustration, a number of relevant extracellular proteins and their interactions are showed. Collagen VI interacts, among other proteins, with biglycan and eventually with dystroglycan. Dystroglycan is in turn associated, intracellularly, with the protein dystrophin.



**Genetic tests** looking for abnormalities in one of the 3 genes responsible for Ullrich congenital muscular dystrophy are now available and provide the ultimate diagnosis. These tests however are still only done on a research basis and are very time consuming. The results are often only available after many months.

**Prenatal diagnosis** is a promising development in the diagnosis of inherited conditions. It is based on the ability to detect the abnormality in the developing foetus. In families who have a child with Ullrich congenital muscular dystrophy who decide to have another baby it is possible to detect whether the baby has deficiency of collagen VI and/or the same gene defect early in pregnancy.

#### **Is there a treatment or cure?**

At the moment there is no cure for congenital muscular dystrophy, but there are ways, described below, of helping to alleviate the effects of the condition.

#### **Can a child with UCMD learn to walk?**

The severity of this condition varies greatly from person to person. Some children will walk but sometimes this can be delayed. Children who have successfully walked may lose the ability later on because as they grow taller and heavier, their muscles are unable to cope with a greater strain. Leg splints (callipers) are often used to assist the child to walk.

Other children never achieve the ability to walk independently but can only stand and walk with leg splints.

### **What other physical effects might Ullrich CMD have on a child?**

As the muscles are weak and mobility is limited, the child may be born with or develop 'contractures', this means that the muscle tendons tighten up and the child is unable to move the limbs or the joints as freely as a healthy child. Physiotherapy can help prevent this and a programme of exercises which may be carried out daily by parents at home should be worked out with a physiotherapist very soon after diagnosis.

Even a very young baby can be helped to maintain suppleness. Hips are commonly affected and if they are dislocated this may require treatment with a splint or, only very, rarely surgery.

Most of the children with Ullrich congenital muscular dystrophy also develop a curvature of the spine (scoliosis)

As collagen VI is also normally present in the skin, children may have a tendency for scars to heal slowly or become thickened and elevated (keloid formation).

### **Is UCMD progressive and is it life threatening?**

In the first years the condition is fairly stable and the child usually appears to gain strength as he or she gets older. Motor function remains relatively stable but when children reach puberty, might experience increasing difficulties, as muscles find it difficult to cope with the greater strain of increased weight and height.

Children who have achieved independent walking often need some help at this age and long leg callipers are often provided to assist them to walk.

While motor function remains relatively stable or only slowly progressive, children often experience breathing problems at night because the muscles which assist breathing are affected. It is therefore very important to monitor this function on a regular basis by performing 'sleep studies'. This test is very simple and consists in applying a small wrapping around one finger. The wrapping is connected to a small machine which records the level of oxygen throughout the night. Night time breathing problems may happen in children of any age and, when present, children feel tired, often have headaches on waking in the morning, may feel sleepy during the day and lose appetite and weight. Another problem can also be that of frequent chest infections. If these signs are present or if the level of oxygen recorded at night are not satisfactory, children can be helped by referring them to a respiratory physician who will provide a means of supporting breathing at night (ventilator). This usually requires a special facial or nasal mask attached to a small machine which pumps air in and out of the lungs.

Another frequent problem after the first few years is failure to thrive and it is therefore also important to monitor weight and height to be sure that children with Ullrich congenital muscular dystrophy receive enough food and energy. In several cases feeding supplements are needed.

Sometimes a small surgical procedure called gastrostomy can be performed to help the child to receive the appropriate level of feeding to maintain his or her weight.

### **What help is available?**

Physiotherapy is one of the main forms of help. An initial physiotherapy assessment at the time of the diagnosis should be followed by an exercise programme and regular check-ups. The main aim of physiotherapy is to keep the muscles as active as possible and to prevent the formation of contractures (muscle tendon tightness causing restriction in the range of joint movement). Children are encouraged to remain as active as possible. Swimming is a particular good form of exercise.

Physiotherapy can also help provide orthoses, such as splints and long leg callipers and a wheel chair when necessary.

It is also important to provide a proper sitting and standing posture to prevent curvature of the spine (scoliosis). If a curvature occurs a spinal brace may help to prevent further deterioration of the curvature. Surgical intervention (scoliosis surgery) might be needed in some cases.

### **Where can I get help?**

#### **Muscular Dystrophy Campaign**

61 Southwark Street  
London SE1 0HL

Tel: **020 7803 4800** (all departments)

Freephone: **0800 652 6352**

Email addresses:

Information and Support Line: [info@muscular-dystrophy.org](mailto:info@muscular-dystrophy.org)

Research: [research@muscular-dystrophy.org](mailto:research@muscular-dystrophy.org)

#### **Contact a Family**

209-211 City Road,  
London EC1V 1JN

Tel: **020 7608 8700**

Fax: **020 7608 8701**

Helpline: **0808 808 3555** or

Textphone: **0808 808 3556**

Freephone for parents and families (10am-4pm, Mon-Fri)

Email: [info@cafamily.org.uk](mailto:info@cafamily.org.uk)

Web: [www.cafamily.org.uk](http://www.cafamily.org.uk)

**Other MDC factsheets that may be useful**

- Congenital muscular dystrophies
  - MDC1A (merosin-deficient congenital muscular dystrophy)
  - Rigid spine syndrome
  - Ullrich congenital muscular dystrophy
- Carrier detection tests and prenatal diagnosis of inherited neuromuscular conditions
- Inheritance and the muscular dystrophies
- Muscle biopsies
- Surgical correction of spinal deformity in muscular dystrophy and other neuromuscular disorders

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Author: MDC Research Department, in association with Francesco Muntoni, Professor of Paediatric Neurology, Hammersmith Hospital.

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