



**CONTACT:**  
Carolyn Leigh  
Joshua Frase Foundation  
carolyn@joshuafrase.org  
617-715-1155  
www.joshuafrase.org

---

## Joshua Frase Foundation Supports Breakthrough Discovery of Gene Responsible for Muscle Weakness

*The identification of the new centronuclear gene brings us one step closer to curing myopathies*

**BOSTON, MA, October 25, 2005** - Scientists from Europe and the United States recently identified a second gene that can cause centronuclear myopathy, a rare hereditary muscle disease characterized by weakness and potentially resulting in difficulty walking, breathing, and eating. Alan Beggs, PhD, who directs JFF supported research on centronuclear myopathy (CNM) at Children's Hospital Boston and Harvard Medical School, was a member of the team who announced the finding in an advance online issue of *Nature Genetics* on October 16, 2005.

The knowledge of this second gene will allow for improved diagnosis of individuals with autosomal dominant CNM, as well as provide a better understanding of the cause of all forms of this condition.

The new CNM gene is named *DNM2*, after its protein product dynamin 2. This work demonstrated that alterations in certain parts of the *DNM2* gene cause dynamin 2 not to work properly, resulting in the development of muscle weakness and other findings characteristic of CNM. Alterations in other regions of the *DNM2* gene have previously been identified to cause another hereditary condition called Charcot-Marie Tooth disease.

*DNM2* alterations in patients with CNM are inherited in an autosomal dominant manner, meaning that only one copy of a non-working *DNM2* gene is necessary to cause the condition. Therefore, a parent with a *DNM2* alteration can pass CNM directly to his or her children. The study also describes two individuals with new (*de novo*) alterations in the *DNM2* gene, which were not found in either parent. This finding suggests that not all individuals with CNM caused by *DNM2* alterations will have a family history of the condition.

Prior to the discovery of *DNM2*, only one gene was known to be associated with CNM. The *MTM1* gene, identified in the 1990's, causes a specific form of CNM known as X-linked myotubular myopathy. X-linked myotubular myopathy primarily affects boys and generally causes severe muscle weakness and breathing problems from birth. In contrast, *DNM2*-related CNM affects both boys and girls equally and many patients have a later onset and eventually have families of their own.

The discovery of *DNM2* will permit patients with autosomal dominant CNM to pursue genetic testing. This opportunity will result in improved diagnosis by allowing for the confirmation of

diagnoses suggested by muscle biopsies. It will also provide the option to pursue prenatal testing. "We are very excited about this discovery, because it also opens a whole new avenue of research into the underlying cause of muscle weakness in CNM. I'm very hopeful this will bring us closer to the development of future treatments and cures for these disorders" said Dr. Beggs.

The research on CNM at Children's Hospital Boston is supported in part by the Joshua Frase Foundation (JFF) and its generous donors.

For more information on this discovery or to learn more about the work of Dr. Beggs' team at **Children's Hospital Boston** please contact Elizabeth Taylor, Genetic Counselor at 617-919-2169 or [etaylor@enders.tch.harvard.edu](mailto:etaylor@enders.tch.harvard.edu) or visit the lab's website at [www.childrenshospital.org/research/beggs/](http://www.childrenshospital.org/research/beggs/).

### **Joshua Frase Foundation**

Paul Frase, veteran of an 11-year NFL career, and his wife Alison created JFF in 1995, when their son Joshua was diagnosed with a neuromuscular disorder called Myotubular Myopathy (MTM). Children with MTM suffer from improperly developed muscles and a quality of life that is greatly impaired. More than two thousand children are born with neuromuscular diseases each year and only 50% of the children born with MTM live to the age of two due to respiratory failure. Joshua is ten years old and with the help of JFF he, and other children, continue to defy the odds each day.

For more information or to make a donation visit [www.joshuafrase.org](http://www.joshuafrase.org)

###

Former NFL player Paul Frase and his wife Alison founded the Joshua Frase Foundation (JFF) in 1995. Their son Joshua is battling a neuromuscular disease called Myotubular Myopathy. Joshua is among thousands of children that are born with one of hundreds of congenital myopathies. Believed to begin before birth, myopathies vary in the degree of severity and time of onset. As muscle cells of a baby develop in the womb, a blockage inhibits transmission of vital genetic information needed for proper growth. The improper muscular development of the babies ultimately translates into a quality of life that is greatly impaired. The simple task of crawling is impossible. Only 50% of the children born with Joshua's disorder live to the age of two. Fewer still survive past their early school years.

Since its inception, JFF has worked to increase awareness of congenital myopathies and to create a support network for families and friends affected by these devastating muscle wasting disorders. Until the Frase family began to work with Children's Hospital Boston, very little was being done to find a cure for congenital myopathies, specifically Myotubular Myopathy.

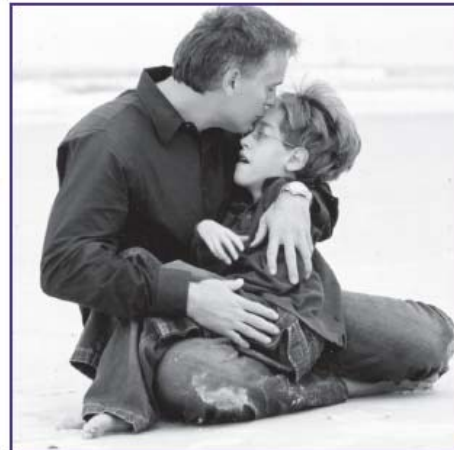
JFF helped to put together a world-renowned team of researchers at Boston's Children's Hospital which has expanded to Wake Forest Institute for Regenerative Medicine in North Carolina. With our team of researchers putting their time, energy and expertise behind the fight for a cure, we are very excited for what the future holds. The Joshua Frase Foundation is thrilled to have pioneered such an aggressive research effort.

The JFF Muscle Dream Team Gala was created nine years ago to raise the necessary funds to continue this battle. With the support of committed friends and generous sponsors, the Joshua Frase Foundation Muscle Dream Team Gala has raised over \$3.3 million for the fight against neuromuscular diseases. The event is an annual tribute to the hope that in time, a cure will be found.

Joshua Miles Frase was born on February 2, 1995. At the time of birth, his muscles were so weak that he couldn't muster the strength to contract his diaphragm to cry. He could flex only his right hand, and his lungs could barely draw the air that he needed to breathe. Paul and Alison were told that he might not survive the day.

When Joshua was three months old, a muscle biopsy revealed Myotubular Myopathy, a devastating, and deadly, muscle disorder. At that time, doctors gave him only a fifty percent chance of living until his second birthday. Josh has overcome many life and death situations since that day, and celebrated his tenth birthday in February, 2005.

Josh just finished the 4th grade at the top of his class. He loves drawing with his computer and amazes his family with his artwork. He also enjoys Sponge Bob cartoons and adores his little sister, Isabella. His big blue eyes sparkle with mischief and his smile can light up a room. In so many ways, Joshua is like any other ten year old; he's just trapped in a frail little body that doesn't work very well.



*Your support is needed if children like Joshua are to live and thrive*