



IOWA STATE UNIVERSITY

Veterinary Diagnostic and Production Animal Medicine

Arthrogryposis Multiplex (aka Curly Calf Syndrome)

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In the fall of 2008 a genetic defect in Angus cattle called Arthrogryposis Multiplex (AM) was identified. This trait has been widely disseminated in the breed because several popular sires were carriers. AM calves are usually born dead and have a curved spine. These calves will be small with little muscle development, and their legs are usually rigid and with hind limbs extended. The genetic defect causes a mutation leading to a missing segment of DNA that affects two different genes. One of these genes is normally expressed during development of nerves and muscles leading to characteristic symptoms.

The genetic defect appears to be a simple recessive trait. Calves that are homozygous recessive (cc) would be born with the disease and die. Heterozygous individuals (Cc) would be normal but carry the gene to pass on to offspring. Homozygous dominant (CC) would be normal and not pass on the trait to their offspring. As seen in the tables below crossing AM free animal to AM free animal results in all offspring being AM free. Breeding AM free animal to an AM carrier animal results in all calves looking normal with 50% chance of offspring being AM free and 50% chance of being AM carriers. Crossing two AM carrier results in 25% chance of a AM calf, 25% chance of a AM free calf and 50% chance of AM carrier.

		AM Free	
		C	C
AM Free	C	CC	CC
	C	CC	CC

		AM Free	
		C	C
AM Carrier	C	CC	CC
	c	Cc	Cc

		AM Carrier	
		C	c
AM Carrier	C	CC	Cc
	c	Cc	cc

A genetic test has been developed to determine if cattle are carriers. A list of authorized labs is available on the American Angus Association website. You should consult with the specific labs for forms, preferred sample type and cost. Although not testing samples the Stockman's Resource Center in Eddyville, IA 641-969-4111 is collaborating with an approved lab. Angus seedstock producers will probably test their herd and sale bulls. If producers have had a calf with AM then they have carriers in their herd. There is an extensive list on the Angus Association website of results of AM testing of bulls. Angus cattle will be designated AMF if they are AM free or AMC if they are AM carriers. Producers should check their bloodlines and determine if they have used AM carriers in their herd. Producers should buy only AMF animals, especially if they have carriers in the herd already. It is also important to note that this is not only a purebred Angus disease. Angus genetics have been used extensively in commercial breeding programs and composite breeds.

For additional information please contact the beef production medicine group (515-294-3837) or the veterinary diagnostic lab (515-294-1950) at Iowa State University. Additional information is available from the American Angus Association (<http://www.angus.org>) or 816-383-5100.