

American Angus Association®

Contractural Arachnodactyly (CA)

Fact Sheet

ANGUS
THE BUSINESS BREED

The following fact sheet was developed to respond to questions commonly asked by American Angus Association members. Additional information may be found online at www.angus.org.

What is Contractural Arachnodactyly (CA)?

CA calves are normally born alive and most can walk, suckle and survive. The birth weight of CA calves is normal. The phenotype is subtle and hence CA may not initially be recognized as an inherited defect (Figures 1 and 2). Contractures which reduce the range of angular movement of the upper limb joints are present at birth in CA but are much less severe, without rigid joint contractures. Due to these contractures, CA calves at birth assume an abnormal crouched posture, resembling an elk or deer fawn, with the feet placed more to the rear than normal, hocks pulled up and back and the spine slightly arched. In their first days of life, CA calves are also flat down on their pasterns. Although there is a reduced range of movement ("contracture") in the upper limb joints, particularly the hip, stifle and hock, there is an increased extensibility of the lower limb joints, particularly the pasterns. CA affected calves are reported as taller and more slender, than their unaffected siblings.

Australian researchers assert that the inability to passively extend the hip, stifle and hock joints to the normal extent by pulling downwards on the foot of a newborn calf -- while it is held on its side on the ground -- is a valuable diagnostic sign in CA cases.

Affected calves can show significant recovery and usually appear relatively normal by 4 to 6 months of age. As weanlings and yearlings, the CA calves appear lighter framed and lighter muscled, particularly in the hindquarters. Most perform poorly and remain tall, slender animals with poor foot conformation. The more normal appearance of CA cases as mature adults makes early evaluation of the phenotype essential. Australian researchers have also reported the early onset of degenerative arthritis in cows that were CA-affected as calves, particularly in the stifle joints. Figures 1 and 2 are images of CA calves.



Figure 1

Figure 2

What causes CA?

The CA phenotype is caused by a recessive mutation on a single cattle chromosome. Cattle that are homozygous for the mutated gene will exhibit CA.

What is a CA carrier?

For the purpose of this response, a CA carrier is an Angus or Angus-cross cow, heifer, bull or steer that carries the recessive CA mutation in their DNA.

Why are carriers of CA important?

Carriers of CA used in breeding programs (registered or commercial) are responsible for propagating the recessive mutation within the cattle population.

What does a CA carrier look like?

A CA carrier looks perfectly normal; there is nothing in the way an animal looks (its phenotype) that indicates that the animal is a carrier of the CA mutation.

If a cow has a CA calf, what does that mean?

If a cow has a CA calf, and if it is the cow's natural calf, it means that the cow is a carrier of the CA mutation and the sire of the calf is also a CA carrier.

If a recipient cow has a CA calf, what does that mean?

If a recipient cow has a CA calf, it means only that both the donor cow and the sire of the calf are carriers of the CA mutation. It doesn't tell you anything about the CA carrier status of the recipient cow.

If a bull sires a CA calf, what does that mean?

If a bull sires a CA calf, it means that the bull is a carrier of the CA mutation and that the dam of the calf is also a CA carrier.

I have never had a CA calf. Does that mean my cows are non-carriers?

Not necessarily.

What is the risk of having a CA calf if I breed a CA carrier cow to a CA carrier bull?

Every time you breed a carrier to a carrier, there is:

- A 25% risk of having a CA affected calf;
- A 50% risk of having an otherwise normal-appearing calf that carries the CA mutation;
- A 25% chance that you will have a normal-appearing, non-carrier calf.

If I breed a CA carrier cow to a non-carrier bull, what is the chance of having a CA affected calf?

Zero. You will never have a CA affected calf if you breed a carrier cow to a non-carrier bull. (excluding the possibility of a spontaneous mutation)

Is there a test for CA?

Yes. A DNA test is available to determine if an animal carries the CA mutation in their DNA. The type of DNA sample required to perform the test varies from lab to lab but includes; hair root samples, blood-spot or FTA cards, whole blood in "purple-top" tubes, tissue samples from ears and semen samples.

A video on www.angus.org explaining how to collect the sample can be found [here](#).

What do I do with confirmed female carriers in my herd?

You have several options:

- If you have a cow that carries the CA mutation and you want to produce calves from her; you must make a commitment to test all offspring retained for breeding; (check policy regarding registration requirements)
- If you have both a registered and a commercial herd, retain your carrier cows in the commercial herd, breed to a non-carrier bull, and test any calves retained for breeding purposes;
- If you always breed your carrier cows to a non-carrier bull, you will never have a CA calf.
- Use your CA carrier cows as ET recipients. As a recipient female, she has no genetic effect on the embryo calf she raises.

CA potential carrier report & potential carrier management tool

AAA Login users can access interactive tools to generate a report of owned animals and their Contractural Arachnodactyly (CA) status based on the CA test results received to date. From the AAA Login menu, go to the "interactive" section and click on "Potential Carrier Report AM/NH/CA/DD/M1/D2" or "Potential Carrier Management Tool (PCMT)." The PCMT can identify those animals in your herd that have the most descendants in your herd and would be the most logical animal to start a testing scheme should you decide to test for a particular genetic condition. If you are not a current AAA Login user, you can sign up to create an online profile at www.angusonline.org.

What is the AAA registration policy regarding CA?

	If a calf is a potential carrier submitted for registration after 9-13-12.
Heifers	Must be tested and can be registered regardless of the test outcome.
Bulls	Must be tested and only those that test CAF can be registered.
E.T. Calves	Registration is based on sex of calf and if they are sired by a bull that is an A.I. sire as described below.
Steers	No test required.
A.I. Sires that are confirmed carriers	Calves cannot be registered that are conceived more than 60 days after the date a non-owned bull (a bull that would require an A.I. Service Certificate) is listed as a carrier animal (CAC).
Definitions	CAC - CA Carrier, has been tested and carries the CA mutation. CAF - CA Free, has been tested and does not carry the CA mutation. CAP - CA Potential Carrier, animal that traces to one or more confirmed tested carrier animals in its pedigree that have no intervening ancestors that have been tested free of CA.

Two Testing Options

1. Submit Samples through American Angus Association/AGI

Use [AAA Login](#) to order tests. Samples are submitted to the American Angus Association and archived for future testing requests. Login at www.angusonline.org and use menu option: Order--Testing for AM/NH/CA/DD/M1/D2.



2. Additional Authorized Labs for Contractural Arachnodactyly (CA) Testing

Below are the labs currently authorized for CA testing by the American Angus Association. Consult the respective lab web sites for information on DNA preferred sample types, sample submission forms, pricing information and complete instructions on how and where to submit samples for testing. In choosing a lab, members of the Association are urged to read and carefully consider any language on a given lab's submission form (for the CA test) or on its accompanying "Terms and Conditions" that relates to any lab's alternative use of the DNA samples being submitted.

Contact the PBB DNA team for further information

PBB DNA

Ph: (06) 323 4484

E: dna@pbbnz.com