**WHAT BLOOD TYPES DO CATS HAVE?**

Cats have one major blood group with three blood types. These are blood type A, type B and type AB. The different blood types are determined by different forms of neuraminic acid (a type of sugar) on the red blood cell surface. Type A cats have the ‘A’ form of neuraminic acid, type B cats have the ‘B’ form of neuraminic acid and type AB cats have both forms. During red blood cell development, the ‘B’ form of neuraminic acid is converted to the ‘A’ form by the enzyme cytidine monophospho-*N*-acetylneuraminic acid hydroxylase (CMAH).

**WHAT ARE THE PREVELENCES OF BLOOD TYPES IN CATS**

This varies significantly with cat breed, but in general type A is much more common than type B. In some breeds (e.g. Siamese) type B is very rare or non-existent, and in other breeds (e.g. British Shorthair, Cornish Rex and Devon Rex) type B is quite common, with over 30% of cats having this blood type. Type AB is generally rare at around 1-2% of cats, the exception being Ragdoll cats where the prevalence is around 18%.

**WHY WORRY ABOUT CAT BLOOD TYPES?**

Unlike in humans, all blood transfusions between cats require blood types to be matched, otherwise fatal transfusion reactions can occur. However, for breeders this is not the main concern regarding cat blood types. Neonatal isoerythrolysis, part of ‘fading kitten syndrome’, is of much greater concern to cat breeders, especially those whose breeds have a high percentage of type B cats.

Neonatal isoerythrolysis (NI) typically happens in type A kittens born to a type B queen. Type B queens usually have high levels of anti-A antibodies in their blood, which are secreted into their colostrum. When type A kittens suckle a type B queen they get a high dose of anti-A antibodies, which bind to their red blood cells and cause them to breakdown; this can cause severe anaemia and even be fatal. The reverse scenario of a type A queen giving birth to type B kittens rarely results in NI because type A queens usually have low levels of anti-B antibodies in their blood, and these antibodies rarely cause anaemia in the type B kittens.

**WHAT ARE THE GENETICS OF CAT BLOOD TYPES?**

Mutations in the *CMAH* gene stop the ‘B’ form of neuraminic acid being converted to the ‘A’ form and, hence, are responsible for blood type B. The mutations are recessive, meaning that two *mutated* copies (termed b-allele) are required for a cat to be type B; i.e. one from the tom and one from the queen.

This has caused some confusion amongst breeders when cats are tested using a conventional (i.e. non-genetic) blood typing method. Both parents can be reported as ‘blood type A’, and yet can still have type B kittens! This is because a type A cat may carry one b-allele without it affecting the blood type, and mating two such cats can result in blood type B kittens being born. Conventional blood typing methods cannot detect that both parents carry the b-allele since it does not affect the cats’ blood type. Genetic testing can overcome this limitation in conventional blood typing by detecting the b-allele being carried by type A cats. It should be stressed that type B kittens born to a type A queen typically do not suffer from NI. The mutations causing blood type AB in most cats are unknown, although they are thought to be recessive to type A and dominant to type B

**CAN I BREED FROM A BLOOD TYPE B QUEEN?**

If a breeder wants to use a type B queen for breeding they have two main options. The first is to use a type B tom, in this way no type A kittens will be born and NI will not be an issue. The second option, if a type A tom is used, is to remove the kittens from the queen for 24-48 hours after birth so that they do not suckle colostrum and get the high dose of anti-A antibodies that can cause NI.

The proportion of kittens in a litter that can be affected by NI will vary depending on whether the tom is a b-allele carrier or not. A b-allele carrier type A tom will, on average, give 50% type B kittens and 50% b-allele carrying type A kittens. The type B kittens will not suffer from NI and can be allowed to suckle, but the b-allele carrying type A kittens are likely to suffer from NI and should be removed from the queen for 24-48 hours. In this situation it is possible to test the cord blood of individual kittens to determine their blood type immediately after birth, and hence know which kittens can remain with the queen; however, this is often easier said than done! If the type A tom is not carrying the b-allele, then all of the kittens will be blood type A (carrying the b-allele) and, therefore, likely to suffer from NI. The only recourse is to remove all of the kittens for 24-48 hours before they suckle.

**I'VE BEEN TOLD THAT NI CAN'T HAPPEN IN THE FIRST LITTER, ONLY IN SUBSEQUENT LITTERS ...... IS THIS TRUE?**

A common misunderstanding about NI is that it cannot happen in a queen’s first litter of kittens, i.e. a type B queen has to be exposed to type A blood to raise the anti-A antibodies. This is incorrect since type B queens have *naturally occurring* high levels of anti-A antibodies in their blood *regardless* of the number of litters they have had. Therefore, NI can occur in the kittens from the first litter of a type B queen. Whilst most type B queens have high levels of anti-A antibodies in their blood, the levels do vary and some type B queens may have litters with minimal or unnoticed NI. This may be responsible for some cases where type B queens appear to have litters with no apparent NI issues.

**Don't forget that you can use your Bengal CC discount code!!**

Information on how to submit swabs and pricing can be found here: [www.catgenetics.co.uk](http://langfordvets.us2.list-manage1.com/track/click?u=3f6aa0ccd8a5b859b677c3eea&id=2749f1ebb3&e=2a1c0ed932)

*(Source - Langfords Summer 2017 edition - Cat Genetics Newsletter)*