PK Deficiency – Cool Heads Required - Mike Shammas, Mikkar Abyssinians

By now, if you are an Abyssinian breeder, you will almost certainly have read articles about PK Deficiency (Pyruvate Kinase Deficiency to give it its full name). Some of the articles are alarmist, some dismissive. In this article, it is my intention to give you enough information to make informed decisions for yourself, with reasoning and, hopefully, without a whiff of panic. I am not a vet, and this is not a veterinary article.

Briefly, PK is a key regulatory enzyme that controls the release of energy from sugar in red blood cells. Deficiency of PK can lead to rupture of the red blood cells, and their premature destruction, leading to anaemia. The anaemia leads to problems in other parts of the body, to the point of premature death for many affected animals. That much you can read just about anywhere.

However, what you may not have been told is that PK Deficiency is not a specific problem of Abyssinians, or of cats generally, but that many mammals are affected. Cats, dogs, horses, mice and people may all be affected by this condition, which is genetic in origin (so you can't catch it, OK!). Specific cat and dog breeds have been reported as being affected, but, to my mind at least, this may just mean that no-one has looked for or reported it in other breeds (yet!).

PK Deficiency is acquired by being passed **two** 'faulty' genes from the parents. An affected cat will typically have intermittent bouts of anaemia, and may have a shortened life span. Any individual could have one of 3 possible gene combinations:-

- **Normal** (no faulty genes). This is what we would like for all of our Abys in time.
- **Carrier** (one faulty gene). A carrier will not have observable symptoms of the condition, but can pass the faulty gene on to its offspring (to 50% of them, on average)
- **Affected** (two faulty genes). An affected cat may show symptoms, and will pass the faulty gene on to its entire offspring.

It is possible to perform a genetic test to detect which status a cat has, via either a small blood sample or via cheek swabs (also known as buccal swabs).

Now, we want to eliminate this dangerous gene from our breed, but we already have a limited gene pool, so instead of just neutering everything in sight we need a plan. A good plan. One that preserves the bloodlines, whilst eliminating PK Deficiency. One that does not produce any more potentially sickly animals.

This is the plan.

STEP 1 Establish the status of each breeding cat that you have. How? You have two possibilities (for most people only the first will apply)

1. Test the cat.
2. If both parents are known to be **Normal**, via testing, then the cat must be **Normal** as well.

If you bring a cat into your breeding program (whether from abroad, or from within your own country), have it tested. The cost to you is a one-off testing charge per cat.

STEP 2 Publish your test results, either explicitly (web sites, advertisements, etc.) or by contacting all those to whom you have sold breeding stock or provided stud services. This applies equally to all test results, whether Normal, Carrier or Affected. It is your moral duty to pass the information on to anyone that could be affected by your status.

STEP 3 Establish the status of any other cat that will be used in your breeding plan. If you go out to stud, then ask for the status of the stud. Ask to see the test certificate as proof.

STEP 4 In the full knowledge of the status of every two cats that are brought together for mating, use the table below to decide whether to proceed with the mating or not.

Combination	Allow Mating?	Reasoning
Normal - Normal	Always	This is the ideal situation – only Normal offspring will result.
Normal - Carrier	Proceed with caution	Half of the offspring of this mating will themselves be carriers. So any of the kittens intended for breeding will also have to be tested. Your costs will go up, as will those of the owner of such a cat used for breeding. A justification for this might be the preservation of a precious bloodline.
Normal – Affected	Proceed only with extreme caution	All the offspring of this mating will be carriers. The future offspring of the kittens intended for breeding will all have to be tested. The costs will go up for owners of such a cat used for breeding. The only justification for this might be the preservation of a precious bloodline, or that of an outstanding animal.
Carrier – Affected	Never!	Half of the offspring will be affected (the rest will be carriers). **This cannot be justified.**
Affected – Affected	Never!	All the offspring will be affected. **This cannot be justified.**

STEP 5 Only keep Normal offspring for breeding, unless you are intent on keeping a line going and cannot yet separate out the PK Deficiency gene.

If everyone did this, we would quickly eliminate the problem. The reality is, unfortunately, that not everyone will cooperate. But you can do your bit and look after your own cattery name, and encourage others to do the same.

So that is the plan. But how can you get the testing done? Well, there are currently two labs you can use:-

- Dr. Urs Giger at the University of Pennsylvania, USA, will test blood samples or buccal swabs – more can be found on this at:- **w3.vet.upenn.edu/research/centers/penngen/services/deublerlab/pk.html**
- Laboklin in Germany will take blood samples only – more can be found on this at:- **www.laboklin.de/frame.php?lang=en**

I have only used the American lab. Results have taken 5 weeks (from posting of the samples) to get back, and cost $75 (about £40) each. So far all my tests have shown **Normal**, but I still have two cats to test. I know a number of Aby breeders who are also testing and starting to publicise their results too.

There is also a research program being mooted at Bristol University which is aiming to get a large survey of Abyssinian stock through testing at a subsidised price (or possibly free, depending on funding). Andrea Harvey has a questionnaire that was circulated at the Supreme Show in November, and appears in this edition of Papyrus – I would urge everyone who can to take part. The survey could cover all Abys, not just current breeding animals, so that an idea of the history of the problem can be identified.

In summary, PK Deficiency is one problem of many that threaten our breed, but it is one that can be beaten through a simple plan requiring limited testing and selective breeding. There is no need to panic – just taking sensible precautions could rapidly eliminate the problem.

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