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# Blood types in Bengal cats in the UK

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Blood samples from 100 adult Bengal cats from the UK were submitted for assessment of blood type using RapidVet-H Feline blood typing cards (dms Laboratories), with further assessment by standard blood typing in a microtitre plate assay when card typing was inconclusive or revealed blood type B or AB. Ninety-eight cats were found to be type A when assessed using the blood typing cards. One cat initially tested as type AB but was found to be type A on testing a second blood sample using the blood typing cards. One cat initially tested as type B but was found to be type A when a second sample was tested by standard blood typing assay. Finding that 100% of the cats were blood type A is in contrast with previous studies that reported 10 Bengal cats to be type A, four to be type AB and one to be type B.

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Feline blood typing is important in clinical practice to prevent acute haemolytic transfusion reactions and as part of a planned breeding programme to prevent neonatal isoerythrolysis.[1–3] When considering the AB blood group system, cats can be of phenotype A, B or AB,[4–6] with the distribution and frequency of blood types within a cat population varying with breed and geographical region.[4,7–14] Although type A is the most common blood type of pedigree and non-pedigree cats[7,8,11,12] some breeds such as British Shorthair,[9] Turkish Van and Angora[15] have a higher prevalence of type B, whilst Siamese and Tonkinese cats are only of type A.[7,9]

To date, only limited data are available for Bengal cats; one study of eight UK Bengal cats found four type A and four type AB,[9] while a separate study of seven UK Bengal cats reported six of type A and one of type B.[13] The aim of this study was to determine the distribution of blood types in a large population of Bengal cats in UK.

## Materials and methods

Between March 2007 and March 2008 ethylenediamine tetraacetic acid (EDTA)-anti-coagulated blood samples were obtained from 100 adult Bengal cats living in the UK. Most of the samples were submitted by members of the Bengal Cat Club with attention to include many of the currently popular breeding lines. Blood samples were primarily collected for routine pre-breeding checks for feline leukaemia virus (FeLV) and feline immunodeficiency virus (FIV) infections or when non-breeding cats were being sampled as directed by clinical need. The samples were then submitted for assessment of blood type using RapidVet-H Feline blood typing cards (dms Laboratories, Flemington, NJ, USA) as per the manufacturer's instructions. As per the recommendations of Stieger et al[16] and Seth et al[17] any samples showing autoagglutination, or appearing to be of blood type AB or B, were reassessed with a follow-up blood sample. If still appearing to be type AB or B a blood sample was then tested by standard blood typing in a microtitre plate assay. Full details of this assay have been reported by Knottenbelt et al[9] but in brief, the assay involves incubation of a suspension of washed erythrocytes with serial dilutions of anti-A serum from a type B cat, *Triticum vulgaris* lectin for the determination of type B and phosphate buffered saline (PBS, pH 7.4, 0.1 M) as a negative control. The assay is in routine use in a commercial diagnostic laboratory and regularly identifies type A and B cats.

## Results

Ninety-eight of the blood samples were found to be type A when assessed using RapidVet-H Feline blood typing cards. One cat initially tested type AB but was

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found to be type A when a second sample was assessed using the blood typing cards. One cat initially tested as type B but was found to be type A when a second sample was tested by standard blood typing assay.

## Discussion

Bengal cats are now the third most popular breed of pedigree cat in the UK, with almost 3000 being registered in 2007 (General Council of the Cat Fancy [GCCF]; http://www.gccfcats.org). However, this breed is relatively new to the UK, with the first four cats being registered in 1991 (GCCF; http://www.gccfcats.org). Early data indicated that the breed may contain significant numbers of type AB and B cats,[9,13] which was of concern to the breed club who wanted to undertake a more planned breeding programme. Therefore, it was unexpected to find that 100% of the cats in the current study were of type A.

Blood typing cards have previously been shown to be reliable.[9,11,16,18] However, concerns have been raised about the true validity of type B and AB readings, and it is now recommended that these results should be reassessed, preferably using an alternative methodology.[16,17] The results of the present study support this recommendation as both the type AB and B samples were determined to be type A, one on re-testing a second sample using the blood typing cards and the other on performing a standard blood typing assay.

There may be a number of reasons for the difference in findings between the current study and the two previous studies: these include the size of the study populations, the time frame in which the cats were sampled, and the geographic location of the cats sampled. Both of the previous studies assessed only a small number of cats. The Forcada study[13] evaluated only seven Bengal cats, finding six to be type A and one to be type B. However, these samples were only assessed using the blood typing cards so the type B cat could have been a card error. The eight cats assessed in the Knottenbelt study[9] were initially screened using the blood typing cards. Four were found to be type AB and all the results were confirmed using the same standard blood typing assay as used in the current study. In relationship to time frame the current prospective study ran from 2007 to 2008, while the Knottenbelt study[9] is now 10 years old and the Forcada study[13] was retrospective. The current study assessed blood samples from cats living all over the UK, as did Knottenbelt et al,[9] although they may have had a bias to cats living in Scotland and the North of England as that reflects the laboratory's catchment area; Forcada et al[13] assessed cats living in the South East of England. Given the differences between the study populations it is possible that the cats in the two earlier studies represent: (i) early imports, (ii) out-crossing to breeds containing more type B and/or AB cats and/or (iii) genetically isolated groups.[9] Unfortunately, it is not possible to determine which of these possibilities, if any, may have been the case.

It has been suggested that there should be little geographical variation within a particular breed (typically due to international breeding of pedigree cats).[7,8,11] However, marked variation has been seen in some breeds; for example, Birman cats in the UK have a higher prevalence of type B cats compared to Birman cats in the US.[7,11] Therefore, each breed needs to be independently assessed to determine what role geographical variation may play. A number of factors need to be considered, including; where the foundation stock came from, whether or not the cats are (or were) extensively exported or imported, and whether or not out-crossing is (or has been) undertaken (and if so to which other breeds). In contrast to some earlier breeding practices, the current Bengal cat population of the UK is strictly controlled and breeding is only allowed with other Bengal cats. Even back-crossing to new foundation stock (F1 Asian Leopard Cat cross Bengal cats) is performed only rarely. To the authors' knowledge no Asian Leopard Cats have been blood typed; however, four Fishing Cats (which are in the Asian Leopard Cat group) have been tested and were all found to be type A.[19]

This study shows that most Bengal cats in the UK are now likely to be of blood type A. Despite this finding, it is still recommended that all cats should be blood typed before either giving or receiving blood or before being included in a breeding programme.

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