

Zoo volunteers help explain mysteries of the genome

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A chimpanzee named William undergoes his swab training. Credit: University of Leicester

As we approach the 25th anniversary of the discovery of DNA fingerprinting (September 10), University of Leicester geneticists interested in a particular type of DNA are receiving some help from an unusual band of assistants.

Chimpanzees at Twycross Zoo in Leicestershire have been trained to enable keepers to take DNA samples with special cheek swabs.

Dr Richard Badge, of the University's world renowned Department of Genetics, is studying 'mobile DNA' in the genomes of humans and other primates.

Most [genes](#) are always found in the same place in the genome. For example, the human DMD gene, changes in which can cause muscular dystrophy, is always found on the [X chromosome](#). However the 'genes' that Dr Badge and his colleagues study have been moving around the genome throughout mammalian and primate evolution, and are still doing it today.

Dr Badge explained: "This makes every human (and every chimpanzee for that matter!) a little bit different at the DNA level, a little like a DNA fingerprint.

"The reason we are interested in chimpanzees is that the main type of mobile DNA in their [genome](#) apparently moves much more frequently than ours, despite the fact that these mobile DNAs are very, very similar.

"The chimpanzees at Twycross are very valuable because not only do they include unrelated chimpanzees they also have small family groups where the relationships between the individuals is known. This enables us to observe the difference between individuals in terms of their mobile DNA and say something about the process of movement, which is not really understood in detail.

"So far we have samples from fourteen Chimpanzees. We have full pedigrees for many - Noddy is the mum of Flynn, William, and Jomar, for example."

When Dr Badge and his team started the sampling programme at Twycross, they liaised with the Zoo vet, Nic Masters, to take mouth swabs from chimpanzees that had been anaesthetised for routine vet

procedures. However, Kris Hern, the Deputy Head of African Apes and Training Co-ordinator at Twycross, had a better suggestion. She thought that the chimpanzees could be trained to be swabbed.

Dr Badge welcomed this opportunity to get more regular samples from more of the chimpanzees, since many of them, being quite young and very healthy, are not tranquilised at all frequently. Only the older chimpanzees often have dental problems that require sedation.

The Chimpanzee DNA sampling project relies in large part on the use of special buccal swabs that ensure high yields of good quality DNA with minimal contact. The Isohelix DNA swabs are manufactured by Cell Projects in Maidstone UK . Dr Badge said: "We are grateful to Cell Projects / Isohelix for the special swabs which they supplied, enabling us to obtain the DNA samples more efficiently than is possible with traditional swabs. It has made our- and the chimps' task- a lot easier!"

The chimps that are making such a valuable contribution to science are Kip, William, Peter, Samantha and Elly. Choppers, Noddy, Tojo, Ricky, Flynn, Josie, Victoria, Jomar and Mwekundu have all provided DNA while they have been anaesthetized for other reasons.

Kris Hern, who trained the chimps, found some of them took to it better than others - Peter and William proved particularly good at holding their mouths open.

She commented: "The chimps were trained using positive reinforcement to get the desired behaviour. Once the chimps learnt to open their mouths on cue they were desensitised to the DNA wand and by using this technique, the chimps allowed the swabs to be taken. The training sessions with the chimps is voluntary and the chimps find them mentally and physically stimulating."

Dr Badge added: "The chimpanzees get grapes as a reward and so sometimes the swabs come back a little green, but this does not affect our research. We might extract a little grape DNA, but we use highly chimp specific analyses, so it does not interfere."

Bridget Fry, Animal Health and Research Manager at Twycross Zoo, said: "Richard Badge had direct communications through the Research Officer at Twycross Zoo. The Veterinary Department was then able to advise Kris Hern how to collect the samples.

"The ability to acquire DNA samples from our [chimpanzees](#) without a general anaesthetic is a leap into the future. The information that the DNA samples can give the Zoo means that correct matches with breeding animals can be made within the breeding programmes."

Twenty-five years ago in the Department of Genetics at the University of Leicester, Professor Sir Alec Jeffreys developed the technique of DNA fingerprinting, a powerful and elegant way to distinguish between different individuals.

Since then, Sir Alec has won countless international awards for his research, not only on DNA fingerprinting but also on the fundamental mechanisms that generate diversity in human DNA.

This discovery has had far-reaching consequences:

- the identification and conviction of criminals
- the exoneration of innocent suspects
- the identification of victims of crimes, disasters and wars

- the reliable testing of paternity or other family relationships
- the management of endangered species breeding programmes through animal [DNA](#) fingerprinting

Source: University of Leicester ([news](#) : [web](#))

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