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News Release

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Gene study shows how sheep first separated from goats

Scientists have cracked the genetic code of sheep to reveal how they became a distinct species from goats around four million years ago.

The study is the first to pinpoint the genetic differences that make sheep different from other animals.

The findings could aid the development of DNA testing to speed-up selective breeding programmes, helping farmers to improve their stocks.

The research identifies the genes that give sheep their fleece and uncovers features of their digestive system, which makes them so well-suited to a diet of low quality grass and other plants.

It also builds the most complete picture yet of sheep's complex biology. Further studies using this resource could reveal new insights to diseases that affect sheep.

Researchers from the University of Edinburgh's Roslin Institute, which receives strategic funding from the Biotechnology and Biological Sciences Research Council, were part of a global team that has decoded the genome sequence - the entire genetic make-up - of domestic sheep for the first time.

This team - the International Sheep Genomics Consortium - compared the sheep's genes with those of other animals - including humans, cattle, goats and pigs.

The analysis identifies several genes that are associated with wool production. It also reveals genes that underpin the evolution of the rumen - a specialised chamber of the stomach that breaks down plant material to make it ready for digestion.

This collaborative study, involving 26 research institutions in eight different countries, was led by researchers from the Commonwealth Scientific and Industrial Research Organisation, Australia; BGI and the Kunming Institute of Zoology, China; Utah State University and Baylor College of Medicine in the US; and The Roslin Institute.

The BBSRC-funded ARK-Genomics facility - which is part of Edinburgh Genomics at the University of Edinburgh - provided a substantial body of sequence data, including information on which genes are expressed in a spectrum of 40 different tissues.

The study is published today in the journal Science.

Professor Alan Archibald, Head of Genetics and Genomics at The Roslin Institute, said: "Sheep were one of the first animals to be domesticated for farming and are still an important part of the global agricultural economy. Understanding more about their genetic make-up will help us to breed healthier and more productive flocks."

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