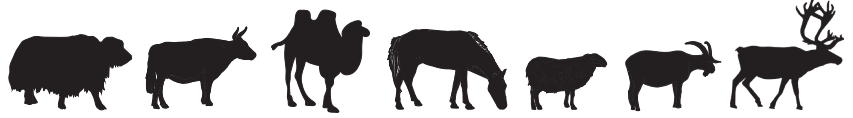


MONGOLIAN DAIRY LIVESTOCK



Mongolia is a land of cattle and...more cattle!



CATTLE

Bos taurus, also known as cattle (ᠶᠡᠬᠡᠷ), were first domesticated more than 10,000 years ago in the Near East. They were brought to Mongolia around 5,000 years ago by migrating herders, and they have been important dairy livestock ever since.

THE DNA SEQUENCE BELOW IS FROM THE CYTOCHROME C OXIDASE 1 (COX1) GENE IN CATTLE. THIS GENE PERFORMS ESSENTIAL FUNCTIONS IN THE ENERGY PRODUCTION OF CELLS. THE COX1 GENE SEQUENCE IS DIFFERENT IN DIFFERENT ANIMAL SPECIES, AND BY SEQUENCING THIS GENE IT IS POSSIBLE TO DETERMINE THE SPECIES OF AN ANIMAL.



1

A partial sequence of the cytochrome C oxidase 1 (COX1) gene is shown below. Part of the sequence is highlighted in **BOLD**. This part of the sequence is 32 nucleotides long, and it is different in each of the major dairy animals in Mongolia.

Bos taurus, cytochrome C oxidase 1 (COX1) gene sequence (partial):

ATGTTTCATTAAACCGCTGACTATTCTCAACCAGCCATAAAGATATTGGTACCCTTTATCTACTATTTGATGCTTGGGCCGGTATAGTAGG
AACAGCTCTAAGCCTTCTAATTCGCGCTGA**ATTAGGCCAACCCGGAACCTCTGCTCGGAGACG**ACCAAATCTACAACGCAGTTGTAACCG
CACACGCATTTGTAATAATCTTCTTCATAGTAATACCAATCATAATTGGAGGATTCGGTAACTGACTTGTCCCTAATAATTGGTGCT
CCCGATATAGCATTTCCCCGAATAAATAATATAAGCTTCTGACTCCTCCCTCCCTCATTCCTACTACTCCTCGCATCCTCTATAGTTGA
AGCTGGGGCAGGAACAGGCTGAACCGTGTACCCTCCCTTAGCAGGCAACCTAGCCCATGCAGGAGCTTCAGTAGATCTAACCATTTTCT

2

Below, we've shown this sequence again in comparison to the DNA sequences found in other dairy animals. This is called an **alignment**. Differences in the DNA sequences between the different animals are highlighted in pink. This sequence is like a **DNA fingerprint** of the animal species.

Cattle	ATTAGGCCAACCCGGAACCTCTGCTCGGAGACG
Yak	ATTAGGCCAACCCGGAACCCCTGCTCGGAGACG
Sheep	ACTAGGCCAACCCGGAACCTCTACTCGGAGATG
Goat	ACTAGGTCAACCCGGAACCCCTACTTGGAGATG
Reindeer	ACTGGGCCAACCTTGGGACCCTACTCGGAGACG
Camel	ATTGGGACAGCCCGGGACGTTGCTTGGAGACG
Horse	ATTAGGCCAACCTGGGACCCTACTAGGAGATG



3

Can you make a DNA bracelet with the CATTLE sequence? Use your beads and string to make a CATTLE DNA bracelet!

A T T A G G C C A A C C C G G A A C T C T G C T C G G A G A C G