

# MONGOLIAN DAIRY LIVESTOCK

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



REINDEER

*Rangifer tarandus* (ᠢᠷᠠᠨᠭᠢᠰᠢᠷ) are native to the taiga and they have thick fur that allows them to survive extreme cold. They are milked only in the north. Reindeer produce very little milk, but their milk is highly prized and excellent for making curds and other creamy products.

THE DNA SEQUENCE BELOW IS FROM THE CYTOCHROME C OXIDASE 1 (COX1) GENE IN REINDEER. 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.



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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.

*Rangifer tarandus*, cytochrome C oxidase 1 (COX1) gene sequence (partial):

ATGTTTCATTAAACCGCTGATTATTTTCAACTAATCACAAAGACATTGGCACCTTGATTTTACTATTTGGTGCTTGAGCAGGCATAGTAGG  
AACTGCCCTAAGCTTACTAATCCGTGCTGA**ACTGGGCCAACCTGGGACCCTACTCGGAGACG**ATCAAATTTATAATGTAATTGTAACCG  
CACATGCATTCGTAATAATTTTCTTTATAGTAATACCAATTATAATTGGAGGATTTGGTAATTGACTTGTCCTCTAATAATTGGTGCC  
CCAGATATAGCATTCCTCGGATAAATAATATAAGCTTCTGACTTCTCCCTCCCTCTTTTCTACTTCTTCTAGCATCATCCATAATTGA  
AGCTGGAACAGGAACAGGTTGAAGTGTACCTCCTTTAGCTGGTAACCTAGCTCACGCAGGAGCTTCAGTAGACTTAAGTATTTTCT

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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  
Yak  
Sheep  
Goat  
Reindeer  
Camel  
Horse

ATTAGGCCAACCCGGAAC**TCT**GCTCGGAGACG  
ATTAGGCCAACCCGGAAC**CT**GCTCGGAGACG  
A**CT**AGGCCAACCCGGAAC**TCT**ACTCGGAGAT**G**  
A**CT**AGG**T**CAACCCGGAAC**CT**ACTTGGAGAT**G**  
**ACTGGGCCAACCTGGGACCCTACTCGGAGACG**  
ATT**GGG**ACAGCCCGGGAC**GTT**GCTTGGAGAC**G**  
ATTAGGCCAAC**CT**GGGACCCTACT**AGG**GAGAT**G**



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

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