

BeefTalk: Fight the DNA Helix

Having all the genetic pieces for a particular cow still does not guarantee the cow will be what is desired.

By Kris Ringwall, Beef Specialist

NDSU Extension Service

Genetics is the foundational structure of all living things, which is, no matter how complicated or simple, like a jigsaw puzzle that has many pieces. The pieces are unique and only fit in one particular puzzle, except if the puzzle is cloned (an exact duplicate produced). Even in that case, not all the pieces may be interchanged with the clone.

We are hesitant to explore our genetic makeup. We are more content managing, fixing or replacing pieces.

This works as long as the piece maker is still around and the fixes are not too costly. Understanding the pieces is the basis for cattle-type discussions critical for the sake of good management.

Imagine each piece of a puzzle is a genetic trait. By placing the piece in the puzzle, does the puzzle actually have the trait?

In genetics, often one cannot see the piece clearly, but the piece must be physically present. An individual cow, bull or calf must have the piece present to perform a certain function.

There are no other options. A lifetime of selection is a lifetime of gathering pieces of the puzzle and figuring out where they go.

In difficult puzzles, the similar pieces may corrupt the puzzle if placed in the wrong spot. Noticing a slight deviation in one piece and changing its placement makes all the difference in completing the puzzle.

Likewise, having all the genetic pieces for a particular cow still does not guarantee the cow will be what is desired. Are the pieces all placed correctly or, just like a jigsaw puzzle, is one piece out of place?

We can go even deeper today because our understanding of how these pieces are made has improved. Genetic traits really are the result of finite biological pathways designed by DNA.

The term DNA is common today. However, the complexity is much greater than one first imagines. Simply knowing one's DNA makeup does not ensure that all the pieces are in the right place.

Biology is quite amazing and redundancy is not uncommon. Genetics among different types of living things, even within the same kind of living things, makes all living things unique.

Keep in mind the jigsaw puzzle! Those involved with genetic selection are compiling pieces and attempting to not only place the piece within a unique living thing, but also arrange the piece so the puzzle makes sense.

Genetically speaking, cattle breeders gather genes. Genes are continuous segments of DNA that primarily are

[Images](#)



The DNA
Puzzle

stored on chromosomes and only usable if they are transcribed to proteins, which in turn are the keys to the many biological systems that keep us living.

Tweaking those systems is not simple, but a tweak or two, an added gene or two or simply a different version of a gene can produce a major biological change. In terms of cattle, that change, if selectable and manageable, produces the many types of cattle that we have today.

Beef producers need to find the piece, place it in the puzzle and arrange it properly. The other day a producer asked what the bottom line was regarding cow size and how we get there.

One thing is known: Whether a cow is big or small, the puzzle that makes up the cow is huge. The pieces are small, numerous and very similar to the naked eye.

The question reminded me that I have to teach a class in genetics starting in April. I know the answer is in the notes, but I am not sure on what page.

More later, but in the meantime, buy a very big, 10,000-piece jigsaw puzzle of clouds and sky that fits on a standard postcard and I will get back to you.

Your comments are always welcome at www.BeefTalk.com

For more information, contact the NDBCIA Office, 1041 State Ave., Dickinson, ND 58601, or go to <http://www.CHAPS2000.com> on the Internet.

NDSU Agriculture Communication

Source: Kris Ringwall, (701) 483-2348, ext. 103, kris.ringwall@ndsu.edu

Editor: Rich Mattern, (701) 231-6136, richard.mattern@ndsu.edu

[Attachments](#)



PDF - The DNA Puzzle 
(bt073108.pdf - 33.51 Kb)



EPS - The DNA Puzzle
(bt073108.eps - 112.82 Kb)