

## Getting to the crest of the matter

It goes without saying that large investments in expertise, time and money are needed to produce a performance horse and key to this is the breeding of good stock.

Potential buyers research the DNA of a young horse by investigating the success of the sire and dam as well as the success of any progeny from the line

However what they might start to do soon is to look more closely, not just at the conformation, but also the way the stud manages and feeds the horses.

### WHY?

#### Humans or horses?



We all know that you can shorten your own life if you smoke or overeat, but it's becoming clear that those same bad behaviours can also predispose your children — *before they are even conceived* — to disease and early death.

Research has shown that shortages or excesses of food during a person's childhood can cause immediate changes in our genes that lead to diabetes, obesity and early puberty. These changes are known as *epigenetics*.

Adaptations that made sense during a time of famine can then transfer to children and grandchildren who live in a time of plenty. For example, studies have shown that overfed male mouse pups developed the telltale signs of metabolic syndrome — insulin resistance, obesity and glucose intolerance — and passed some of these traits to their offspring, which then developed elements of metabolic syndrome *without* overeating. This same effect has been shown in pigs, sheep, cattle, rats, dogs and man.



The result of insulin resistance, obesity and glucose intolerance in ourselves is known as human metabolic syndrome and if we stay 'well furnished' for a period of time, we are at risk of heart attacks, strokes, skin problems, diabetes; particularly if we store our fat round our middle (apple shaped) as this fat is known to be 'metabolically active'/changing the way we metabolise our diet

The same is happening in our equine population. We are starting to understand that as well as inheriting characteristics from the dam and stallion, how we feed the foals and young horses will cause changes in their genes. It seems that these changes might affect the way their body

handles their calories and where the calories are stored in their bodies. With us the fat that is stored around our middle is the most 'risky'.

Initial research with horses suggests that the crest is the danger store or at least an indication that their metabolism has been altered. Crests are associated with insulin resistance in horses. Insulin resistance will have an impact on the way the horse handles his energy metabolism and change the way that the calories are stored and delivered to the muscles.

Fat in a 13.2hh pony, the fat at the bottom is fat you can feel, the rest has infiltrated into his muscle



If a horse has fat above the nuchal ligament (crest), then he will also have extra fatty acids in his blood stream, fat around his organs and fat through his tissues

Performance horses with crests usually don't show clinical signs as exercise is protective against insulin resistance. But if that horse has enforced rest or reduced exercise, then he might become slightly footy or stiff or on and

off lame. Why? Because crests = sign of insulin resistance and metabolic changes.

Metabolic changes (chronic inflammation and insulin resistance) change not only the way that the horse handles his energy intake but also change blood flow. These changes are likely to be epigenetic and can be passed to the next generation.

Horses that are sold on to recreational riders are likely to be highly susceptible to becoming 'good doers' due partly to lack of exercise but also because they might have inherited the 'genetic changes' that causes insulin resistance; whether they are overfed or not!

As the horses age, these epigenetic changes are showing themselves clinically as Equine Metabolic Syndrome, as Cushings, and as laminitis.

Potentially, we are breeding these changes into our blood lines, making it more challenging to feed for performance and minimise metabolic problems and inadvertently some horse owners continue to change the biology of their horses by overloading their metabolism .....perpetuating the 'good doer' propensity.