

Edited by:
Dennis Scott BVSc
MACVSc

EA Veterinary Marketing Ltd
54 Hobill Ave Wiri
PO Box 97-110 Manukau City
Manukau 2241

Ph 09-262-1388 Fax 09-262-1411
Freephone 0800 800-624
email info@ethicalagents.co.nz
website www.eavm.nz

The More Things Change...

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The more things change the more they stay the same.

The biggest problem with animal health in the mid 20th Century was a shortage of veterinarians nationwide.

This led first of all to veterinary clubs subsidizing students on a bond system and then ultimately to the opening of the veterinary school at Massey in the early 60s.

Amazingly over half a century later one of the biggest problems is a shortage of veterinarians in clinical practice!

Veterinarians seem to be busier than ever and pressures engendered have led to debates on

wellness and an alarming number of people leaving practice at a relatively early age.

Corporatization of many clinics, in tandem with the expanding corporatization of the pharmaceutical industry and over regulation of that industry has seen a large reduction in choice for the practitioner.

Covid 19 affecting global shipping has also done its bit to impede access to many pharmaceutical products, which only adds stress to clinicians.



Thus the veterinary shortage has a long lasting effect on the overall wellness of general practitioners but which is the symptom and which is the cause?

Short term fixing of the veterinary shortage will certainly be beneficial but it seems that there are underlying issues that need to be sorted as well.

Legend

Special points of interest:

- * Mating preparation begins at calving!
- * A brief explanation of the effects of steric hindrance in racemic mixtures

Maori have some beautiful legends for much of our natural phenomena.

Some are from deep in the mists of time and passed down from generation to generation by word of mouth.

A more recent legend incorporates the modern population, our flora and fauna and makes a lovely little story.

It is related here on page three.



Steric Hindrance

It seems simple, if a racemic mixture has one isomer that activates receptors and one that doesn't then the single active isomer should be twice as potent as the racemic mix, right? Wrong! It is not so straightforward, but it still is relatively simple chemistry.

The answer lies in the phenomenon of steric hindrance. The word steric comes from Greek and relates to the spatial arrangement of atoms in a molecule. That is why the D and L isomers are often referred to as stereoisomers. We all know what stereophonic sound is, and that is the same derivation and meaning, a spatial arrangement of the sound we are listening to.

"It is a bit like a rugby game, the half back kicks from the base, all the forwards are offside"

In pharmacology, steric effects determine how and at what rate a drug will interact with its target bio-molecules.

Steric effects complement electronic effects, which dictate the shape and reactivity of molecules. Steric repulsive forces between overlapping electron clouds result in structured groupings of molecules stabilized by the way that opposites attract and like charges repel.

Steric hindrance is a consequence of steric effects. Steric hindrance is the slowing of chemical reactions due to steric bulk. In short steric hindrance is defined as the prevention or retardation of inter- or intramolecular interactions as a result of the spatial structure of a molecule.

Putting all of that into plain English, the overlapping electronic

clouds means molecules can interfere with each other in such a way that the non-active isomer may not only not trigger the relevant receptor but also act as a physical block to the active isomer. This is what we know as steric hindrance.

It is a bit like a rugby game, the half back kicks from the base, all the forwards are offside and the only players that can advance are those from behind the kicker. However, they must run through and around the forwards whose mere presence is impeding their progress.

This is the case with the active isomer whose progress is impeded by the non-active isomer presence. Then those pesky electronic clouds come into play; it is as if all the forwards extended their elbows, creating a greater hindrance.

With racemic DL cloprostenol the levorotatory isomer not only has no luteolytic effect, but also creates steric hindrance in the receptors, impeding the action of the dextrorotatory isomer.

Ovarian receptors have 180 times higher affinity for D-Cloprostenol than for the racemic form (DL-Cloprostenol) and uterine receptors have 10 times higher affinity for D-

Cloprostenol than for DL-Cloprostenol and therefore dextrorotatory isomer has a biological activity 3.5 times higher than the D-L form.

This means a higher dosage is required when using DL-Cloprostenol, leading to more collateral effects because of its action on other tissues (intestines, vascular system etc).

Montaser and Desouky (2016) showed that the use of D-Cloprostenol caused a faster decline of progesterone levels than either DL-Cloprostenol or dinoprost. In addition, follicle size post treatment was greater as was first service conception.

Montaser A M and El-Desouky A M. 2016. Effect of Dinoprost Tromethamine, Cloprostenol and D-Cloprostenol on progesterone concentration and pregnancy in dairy cattle. Journal of Agriculture and Veterinary Science 9: 2. Pp 64-67.



Efficacious dose of PGs in the cow

Prostaglandin	Efficacious dose	Coefficient of comparison
Dalmazin	0.150	1
D/L cloprostenol	0.500	3.3
Dinoprost	25.000	166

A Modern Maori Legend

Tane Mahuta, the giant kauri king of the forest was concerned with all the insects invading the dank undergrowth. He asked the tui to live on the forest floor and take care of them but the tui said, "No way. It is cold and dark down there, I want to live up in the tree tops and be free."

Next Tane Mahuta asked the pukeko who also refused, "it is too wet and damp and mud will get in my feet, I will stay in the dry."

Tane Mahuta then approached a cuckoo but the cuckoo was on his way to a nest building competition which it hoped to win and said it did not have the time.

Finally a little bird was buzzing around the tree tops flying beautifully and showing off some lovely colourful plumage. Tane Mahuta said, "Will you help me by living on the forest floor and take care of these damaging insects."

"Sweet as bro'." said the little bird, "no worries."

Tane Mahuta said, "To do that your beak will need to grow long to forage in the undergrowth and you will have to have nostrils at the end to be able to seek out the insects. Your wings will wither away

so that you will not be able to fly up high, and your beautiful feathers will all turn brown."

"No worries!" said the little bird.



Tane Mahuta then decreed, "For the tui you will always have a tuft of white feathers below your neck to mark your cowardice.

The pukeko, being obsessed with dryness, is condemned to live forever in swamps and bogs and be known as the swamp hen.



The cuckoo, because nest building was more important than helping the forest will forever be forced to lay its eggs in other birds' nests and have other birds raise their chicks.



As to our little bird with the great attitude, men will come to this place and adopt your name, to be proudly known as Kiwis, and they will have that same "she'll be right" attitude of the Kiwi bird,



Photography

The sociologist on an African jungle expedition held up her camera to take pictures of local children at play. Suddenly the youngsters began to yell in protest.

Turning red the sociologist turned to the chief and apologized for her insensitivity and told him she had forgotten that certain tribes believed a person lost his soul if his picture was taken.

She explained to him in long winded detail the operation of a camera. Several times the chief tried to get a word in but to no avail.

Certain that she had put the chief's fears to rest the sociologist then allowed him to speak.

Smiling he said, "the children were trying to tell you that you had forgotten to take off the lens cap!"



It Starts Now

In the equine world there is much pressure on getting the female of the species pregnant as soon as possible after giving birth. Traditionally the 'foal heat' occurs three weeks after parturition and often, especially in late foaling mares, there is pressure to mate on this heat.

The pressure is little different in the dairy cattle world and one could say the pressure is even greater on the animal as the results of non-cycling are more dire, resulting in culling of the cow.

Although there is no equivalent of the foal heat the difference is minor in that mating often begins a mere six weeks after the transition period.

While a lot of attention is put upon the non-cyclers with planned mating programs, as with all animal health and welfare initiatives, prevention is better than cure. The more cows cycling normally the easier and cheaper is the whole process. This is all down to the health of the animal thus herd health is vital.

It is a known fact that the primary follicle utilised for the first cycle is in development at the time of calving and any insult or check to bodily health at this time can have a detrimental effect on the progress of this follicle.

Keeping metabolic diseases at transition to a minimum not only saves cows and puts more milk in the vat, it also means better cycling cows and more in calf in the first rounds of mating.

Therefore, if a farm is having problems getting cows in calf, as well as looking at the usual suspects such as low plane of nutrition and the need for synchronisation programs taking notice of metabolic and other problems at transition should be

high on the agenda.

In other words, when a cow calves the farmer should already be planning and taking steps for the mating process. Clearly preventative programs targeting whole herd health at this time have all the ongoing benefits but what about the cow that has clinical problems. Obviously, for that cow's sake, it is vital to correct the problem but also she is an indicator of herd status.



If you see one rabbit on a farm there are likely to be at least 10 more and the same goes with transitional diseases; a clinical case is indicative of the fact that there will be more subclinical cases in the herd.

That means that, while considering the clinical case and that cow's prospects at mating, attention should be given to possible subclinical animals in respect to how they may be non-cyclers later on.

Things to consider when thinking ahead to mating are: mineral and energy levels in the transition cow, vitamin supplementation, post transition copper levels and ovulation synchronisation programs.

Top of the list is mineral status and the most crucial ones are calcium and magnesium. As far back as the 90's Massey University was looking at the effect of calcium levels at calving on future fertility. Clearly milk fever has an effect and so hypocalcaemia is a major factor to consider in mating preparation.

Anecdotally hypocalcaemia was between 5% to 10% back then but, thanks to preventative programs it

seems to have dropped considerably but is still a presence. The aforementioned comments regarding subclinical animals and effects on mating have particular relevance in hypocalcaemia.

Starter drenches have been widely marketed in recent decades but it is important to realise that their effect on mineral status is minimal; their main role being to supply energy and even that is expensive.



Good nutrition is a more economical way to supply energy but of course by springtime, if the feed is not present it is too late to worry about normal nutrition and that is when starter drenches may come into play.

Cows prone to hypocalcaemia can not only be successfully treated orally with Calol but also the targeting of high risk animals at calving can prove to be an extremely successful prevention program.



Cows low in energy readily succumb to ketosis and while supplying energy to these animals via simple forms such as propylene glycol has a beneficial effect, much like a sugar rush to an exhausted athlete, often the problem is ineffi-

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It Starts Now

(Continued from page 4)

cient liver function; the cow has a very poor ability to convert unutilised triglycerides into low density lipoproteins for excretion, leading to fatty liver and more inefficiency.

The way around this in clinical cases is supplying specialist vitamins and amino acids, in particular choline, methionine and the all-important carnitine.

This is easily done parenterally by a veterinarian with Metabolase and on-going oral supplementation can be done by the farmer with Hep Ora.

Vitamin B12 is also vital but supplementation should be parenteral. Ruminants normally get Vitamin B12 synthesized by rumen microorganisms but, in cows with metabolic disease this process can be suppressed so supplementation of this all-important vitamin should be by injection.

The double analogue of Vijec B12 is extremely useful here giving not



only a long-lasting effect but also an immediate appetite stimulant.

According to Underwood in The Mineral Nutrition of Livestock, adequate copper levels are important to ensure acceptable conception rates so that in the post transition period in areas of copper deficiency copper supplementation is essential.

However, if injections are used too close to mating conception rates decrease. There are only a few weeks between calving and the start of mating the timing of copper supplementation is crucial. Fortunately, data shows Copper-jec D to be safe to use up to 10 days before planned start of mating.

So, at transition the common metabolic problems have a detrimental effect on follicle development for the primary follicle for planned start of mating, meaning that mineral and energy levels should be considered of vital importance from a mating perspective from calving right through the transition period until mating itself is underway.



In rugby top teams believe that they have to earn the right to play wide (by doing the hard work up front first) and the same goes for mating programs. Farmers should earn the right to utilise planned mating schemes by first ensuring herd, and individual cow health, is in tip top shape. That starts at transition.

As well as general year-round nutrition care with mineral, vitamin and energy levels in the transition period can bring huge rewards in fertility.

If all else fails then we still have the backstop of planned mating programs such as Econom8 to turn the ship around.



Theft in New York

A young bloke from rural New Zealand got quite a buzz walking down Fifth Avenue in the heart of the Big Apple. He was looking up at the skyscrapers when he felt someone bump him slightly.

With a jolt he remembered he was in New York and reached for his wallet. It was gone. And the youth who had bumped him was hurrying off down the street.

Our lad sprinted after him, grabbed him by the shirt front and said, "Okay pal, you've met your match. Your dealing with a Kiwi boy here. Hand over that wallet.

The youth produced the wallet, ducked out of his grip and ran.

It wasn't until our young Kiwi got back to his room that he saw his wallet where he had left it, beside the bed.



Liniments

Equine medicine has come a long way since the early and even mid-20th Century when all sorts of concoctions were splashed on to horses' legs.

Archaic practices such as firing and blistering have long been decried as barbaric. They were more a case of treating the trainer rather than the horse,

However, as any professional athlete can tell you there are benefits in simple liniments.

Liniment (from the Latin *linere*, to anoint), or embrocation, is a medicated topical preparation for application to the skin.

Liniments are commonly used on horses following exercise, applied either by rubbing on full-strength, especially on the legs; or applied in a diluted form, usually added to a bucket of water and sponged on the body.

They are used in hot weather to help cool down a horse after working, the alcohol cooling through rapid evaporation, and counterirritant

oils dilating capillaries in the skin, increasing the amount of blood releasing heat from the body.

The largest selling liniment in human medicine contains menthol and methyl salicylate plus other ingredients and is marketed as a heating agent that not only heats, but also provides pain relief.

Time attests to its efficacy in the human field and so points to that fact that there is a good reason to use liniments in the equine athlete.

Menthol is also a major ingredient in Penetrene A, which also has stood the test of time in the marketplace as it has been such a superior option to the harsh mercuric iodide ointments of last century.

As in human sports medicines liniments will not cure serious problems but are ideal for keeping a

finely tuned athlete's musculoskeletal system at peak for performance.

Tap C

A patron in a Montreal hotel turned on a tap in his bathroom and was severely scalded.

He called reception and said "This is an outrage. It clearly said C on the top of the tap and boiling water came out."

"But Monsieur, C stands for *chaude* - the French for hot. You should know this if you live in Montreal."

"Hang on," roared the patron, "the other tap is also marked C."

"Of course," said the manager, "That stands for cold. After all Montreal is a bilingual city."



Penetrene 'A' Liniment – when and how to use		
CONDITION	DESCRIPTION	PENETRENE 'A' LINIMENT APPLICATION
Shin soreness	Inflammation and injury to the cannon bone and related muscle / tissue in young horses.	Apply undiluted 3-4 times daily for 4 days, then twice daily until improvement occurs or condition is resolved.
Sprain Injury,	Swelling or trauma to muscles, tendons and joints	Apply undiluted 3-4 times daily for 4 days, then twice daily until improvement occurs or condition is resolved.
Strain	Overstretched muscles and tendons.	Apply undiluted 3-4 times daily for 4 days, then twice daily until improvement occurs or condition is resolved.
Rheumatism	Non-specific, pain in joints, including arthritic joints. May occur in horses of all ages.	Apply undiluted 3-4 times daily for 4 days, then twice daily until improvement occurs or condition is resolved.
To protect muscles and joints. A 'cool down' after exercise.	Protection of joints and muscles of horses with high levels of exercise, racing or performance. A 'cool down' after exercise.	Dilute: 13 mL of Penetrene, 750 mL clean water, 250 mL vinegar See pack label.
Insect bites	Insect bites (flies, lice, midges, mosquitoes) to reduce inflammation.	For pain and inflammation apply Penetrene undiluted to insect bites as required.

Shin Soreness

A major indication for Penetrene A use is shin soreness. Shin soreness is a problem for two- and three-year-old thoroughbreds. It is very painful, affecting the front of the cannon or shinbone, and is a serious issue for the training of young horses. The majority of cases of shin soreness occur just before or when horses begin fast work, mostly both front legs become shin sore. It is rarely seen in hind legs.

Managing shin soreness is important for getting two- and three-year-old thoroughbreds 'ready to race'.

A survey in the USA reported a 70% incidence in all two-year-olds in work.

A survey of trainers based at Flemington and Geelong estimated the incidence of shin soreness at around 80 per cent of two-year-olds in training at these race tracks

Shin soreness in the horse develops when the front surfaces of the cannon bones are subjected to high impact forces during early training.

Topical treatment applied directly to the inflamed area is preferred to oral or injectable anti-inflammatory drugs, and a topical liniment is preferable to an anti-inflammatory as shin soreness consists of minute cracks in the front of the cannon bone itself so the

sooner they are resolved the better, and anti-inflammatory drugs could delay this process.

Of course prevention is always better than cure and the best prevention is nutritional, providing the correct minerals for optimum bone density.

Equine bone is not static and is constantly remodeling. It is a use it or lose it situation.

As little as 10 days box rest leads to a considerable reduction in bone mineral density and it takes 16-20 weeks for the horse to adapt bone to galloping.

Maximising bone density is important for maintaining bone strength and preventing injury. If a horse is not getting correct nutrition, regardless of training, it cannot build strong bone.

"Of course prevention is always better than cure and the best prevention is nutritional"

Kentucky Equine Research (KER) studied the relationship between shin soreness, blood parameters and cannon bone measurements in 30 2yos as they were prepared for ready to run sales in late winter/early spring. 5 of the 30 horses became shin sore and the shin sore horses all had lower bone density.



Increasing bone density should therefore be a major factor in reducing bone related injuries such as shin soreness.

Calcium supplementation is required to increase bone density but calcium uptake is decreased in the higher pH of the stomach if the horse is under omeprazole therapy.

Triacton™ from KER has been shown to be well absorbed even when the horse is on omeprazole, meaning there is no need to stop omeprazole therapy.

Triacton™ increases both bone density and bone thickness by a factor of 3 in most cases. This makes Triacton™ ideal nutritional support for at risk horses.

Triacton™, has as its main ingredient Buffered Mineral Complex (BMC™) derived from marine sources and containing calcium, magnesium and trace minerals.

Hornless Cattle

Nagy was visiting a Canterbury farm and asked the farmer, "Sir, why does that cow not have any horns?"

The farmer replied, "Well Nagy, there are several reasons cows do not have horns. There are some breeds, called polled cattle, where

genetically cows with horns have been bred out so all newborn calves do not have them.

However, most cattle are born with horns and we cut them off, under anaesthetic so they do not feel anything. We do that to prevent them hurting each other in the herd.

We often remove horns when they are calves by putting paste on the horn buds, again with pain relief.

However, Nagy, the reason why that particular one does not have horns is because it is not a cow, it is a horse."



Education

An old farmer died at the age of 90 and arrived at the Pearly Gates.

"Now I will have my reward thanks," he said to St Peter.

"What reward is that?" asked the saintly gatekeeper.

"When I was a lad," said the farmer, "my old Dad took me out of school and put me on the ploughs. When I constantly complained that I wanted an education he said that I would get my reward in heaven. I am here and I want my reward. I want an education."

St Peter said he was a fair minded bloke but told the farmer he would have to mark time for a while and sent him off on a heavenly tour for a hundred years.

When he returned a century later the old farmer once again demanded his education.

"Sorry, not ready yet," said St Peter and sent him on another one hundred year heavenly tour.

When he returned from his second trip the old man was adamant.

"No more procrastination (which is a big word for an uneducated farmer) I want my education," he insisted.

"Okay," said St Peter, "I'm sorry Pops. I will have to level with you. As soon as a teacher arrives up here you will get you education as promised. In the meantime take another trip."

