Wildlife Vets Namibia May 2019 Edition 14

NEWSLETTER MAY

Dear clients,

In this newsletter a quick reminder on how to hold an antelope correctly. We also give more information on an interesting little critter; the rhino bot fly. In the last section background information can be found on how the immobilizing drugs works. We hope you enjoy this newsletter. If you have any suggestions on topics, let us know!

All the best!

Kind regards, Ulf and Mariska

HOLDING AN IMMOBILIZED ANTELOPE

When we immobilize antelopes, we always make quite a fuss about how the handlers should hold the animal. Holding the animal correctly is not just for safety purposes, but also to safeguard the immobilized animal's wellbeing. Rule no 1 is to get the antelope in sternal position immediately, and put pipes on the horns (not in young antelopes since the horn base is still weak, and the risk of horn breakage is big)! After that the animal must be controlled by holding it in the following way:

- Keep the antelope in sternal position (on the belly). This is a near-normal body position which allows for ruminal gas to escape. This gas is a normal product of rumen fermentation, which is usually blown off through eructation (burping). If the animal is not kept sternal, the gas cannot escape, and the animal will start bloating. This puts the animal at risk of suffocation (increased pressure on the diaphragm) and bringing up rumen fluid which, if aspirated, will result in fatal pneumonia.
- The head should be higher than the level of the rumen, to prevent regurgitation.
- The mouth/nostrils should be lower than the throat (and pointed downwards) to allow saliva and rumen fluid to drain out. If the mouth and nose are pointing upwards (which happens when the handlers hold the horns on the top instead of by the base and push the horns down – left photo), the saliva or regurgitated rumen content may enter the lungs. This might cause aspiration pneumonia, and can be fatal!
- The handlers must hold the horns low at the base, and hold the antelope's nose between their legs (right photo). This way they have maximum strength over the animal when it gets feisty. Take care however not to block the nostrils.

Inexperienced or scared handlers often stand away from the head and grab the antelope high up the horns, thereby pushing the nose into the air (L. photo) – risk off aspiration pneumonia! The antelope also has lots of space to move his head around.

When the antelope is held properly (R. photo), the handler has much more control over the head.

Thanks to the Okatjeru-team for the demonstration photos!

Rhino bot fly on a white rhino © J. Erdtsieck

LIVING INSIDE THE RHINO

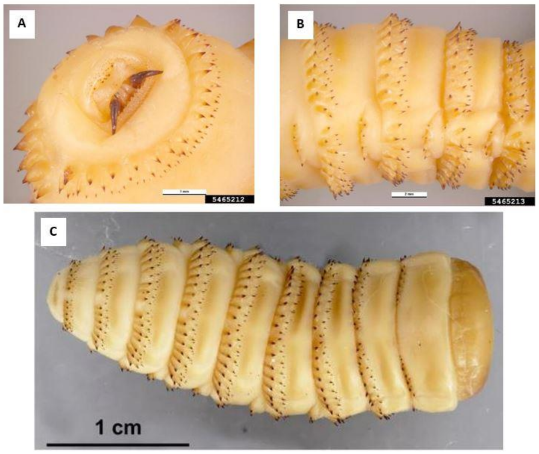
In the category weird flies… meet the rhinoceros bot fly! The rhino bot fly (*Gyrostigma rhinocerontis),* even though rarely seen, is the largest fly in Africa. This strange critter usually lays its eggs on the horn and face and does so **only** on white and black rhinos.

Rhino bot fly eggs at the base of a white rhino horn © Wild tomorrow Fund - Entomology

After about 6 days the larvae hatch from the eggs, measuring only 2.5 mm. The tiny larvae use their mouth hooks and spicules (small needle-like anatomical structures), to migrate to the rhino's stomach. How they exactly do this is still a mystery, they might migrate to the mouth and nostrils, and enter there, or they burry themselves a way in through the skin.

The larvae develop inside the stomach of the rhino, where it feeds on blood and tissue. The larvae go through 3 stages; when they are ready to start their metamorphoses into a pupa, they leave the rhino's body via the intestinal tract, and come out with the faeces. The pupa buries itself in nearby ground for the next 6 weeks.

A large number of larvae from all stages can develop simultaneously in the rhinos' stomach. © Benoit Gilles



Stage 3 larvae. They are now mature and about 4 cm long. Note the sharp mouth parts and spicules © Benoit Gilles

After those 6 weeks, the pupa has become a fly. They measure between 3.5 and 4.1 cm, and have a wingspan of almost 7 cm! The colour of the head ranges from orange to brown/black. The body is brown/black with stripes and the legs are reddish. Adults only live for about 3 to 5 days; as their mouthparts are not developed, and they cannot feed. In that short lifespan they have to find a mate, and a rhino host to lay the eggs on.

Entomologists still have much to learn about this fly, we still don't know how the interaction between the fly and the rhino works. Why are rhinos the only hosts? And what are the effects of the many larvae in the stomach? It does not seem that the rhinos are too bothered by them. Similar fly species occur in equids (also hindgut fermenters like the rhino). The rhino and the rhino bot fly are a good example of how important it is to conserve species; if the rhino goes extinct, this strange, yet amazing fly, will be lost forever as well.

The biggest fly of Africa; the rhino bot fly. © Vida van der Walt

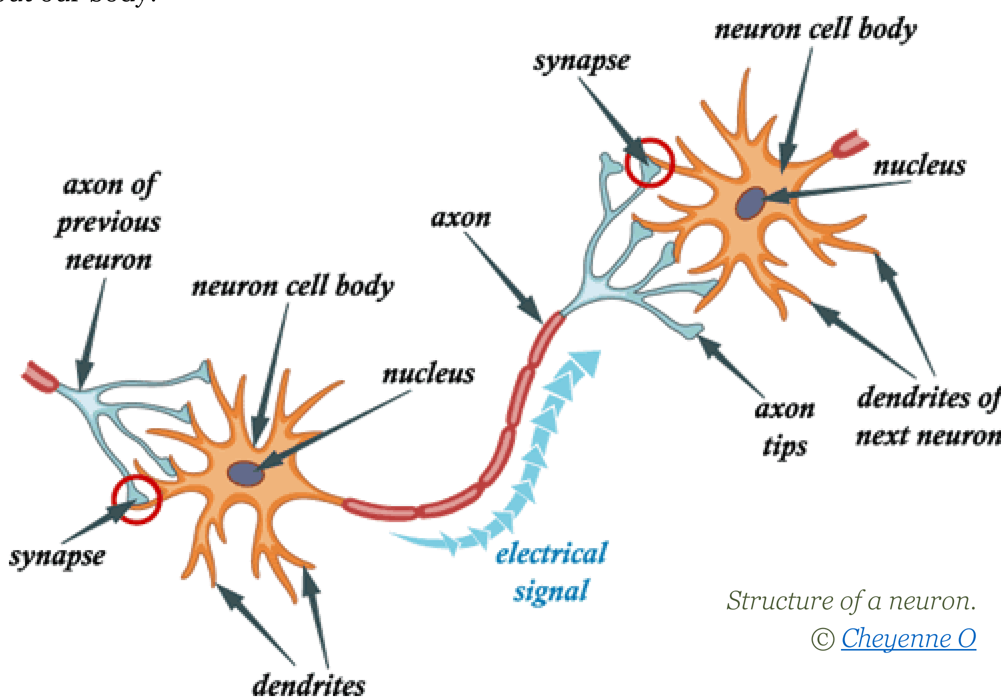
WILDLIFE VETS NAMIBIA

HOW DO IMMOBILIZING DRUGS WORK?

Have you ever had an aesthetic? Chances are that it took quite a while before you were fully awake again. With wild animals we work much quicker, when we immobilize an animal, we give it an antidote. The animal changes from being sleepy to fully awake in just 30 seconds! How is this possible?

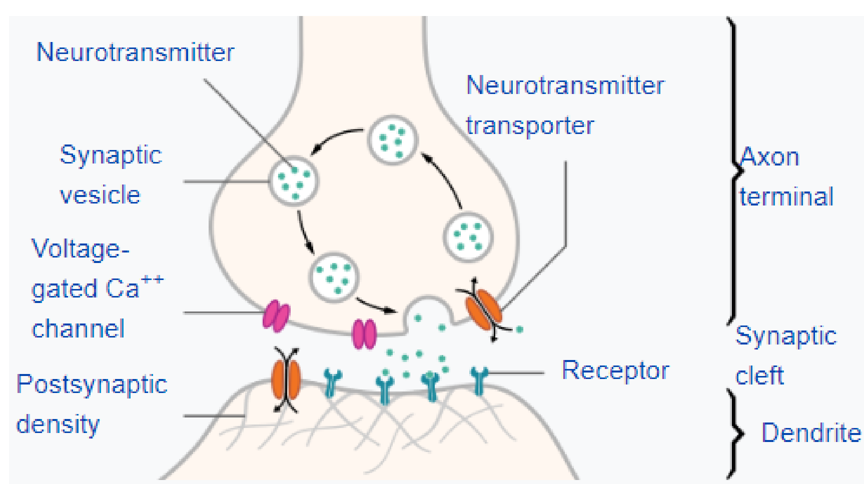
To better understand how the process of immobilizing and waking up (or reversing) goes, we must go deep into the body, all the way to the neuron. Neurons are the cells that make up the brain and the nervous system. They are basically the building blocks of our nervous system and are specialized to transmit information (in the form of electrical signals) throughout our body.

Most neurons consist of 3 basic parts; the cell body, axons and dendrites. The *cell body* contains a nucleus and cytoplasm. The *dendrites* receive electrical signals (with information) from other cells. The *axons* extend away from the cell body, transmitting the electrical signal out. Simply said, dendrites bring information to the cell body, and axons take the information away from the cell body.



Structure of a neuron.
© Cheyenne O

So how do the neurons 'talk' to each other? All the action happens in the synapse. The synapse is the point of connection between two neurons, or between a neuron and a muscle or gland. The dendrites of the one neuron are covered in synapses, which are connected to the axons from other neurons. When the electrical signal reaches the end of the axon, *neurotransmitters* are released into the synapse. Neurotransmitters are basically chemical messengers. The neurotransmitters diffuse across the synapse and bind and activates a *receptor*. The binding of neurotransmitters to a receptor causes an 'action', such as a muscle contraction. This whole process takes place in less a 1000th of a second.

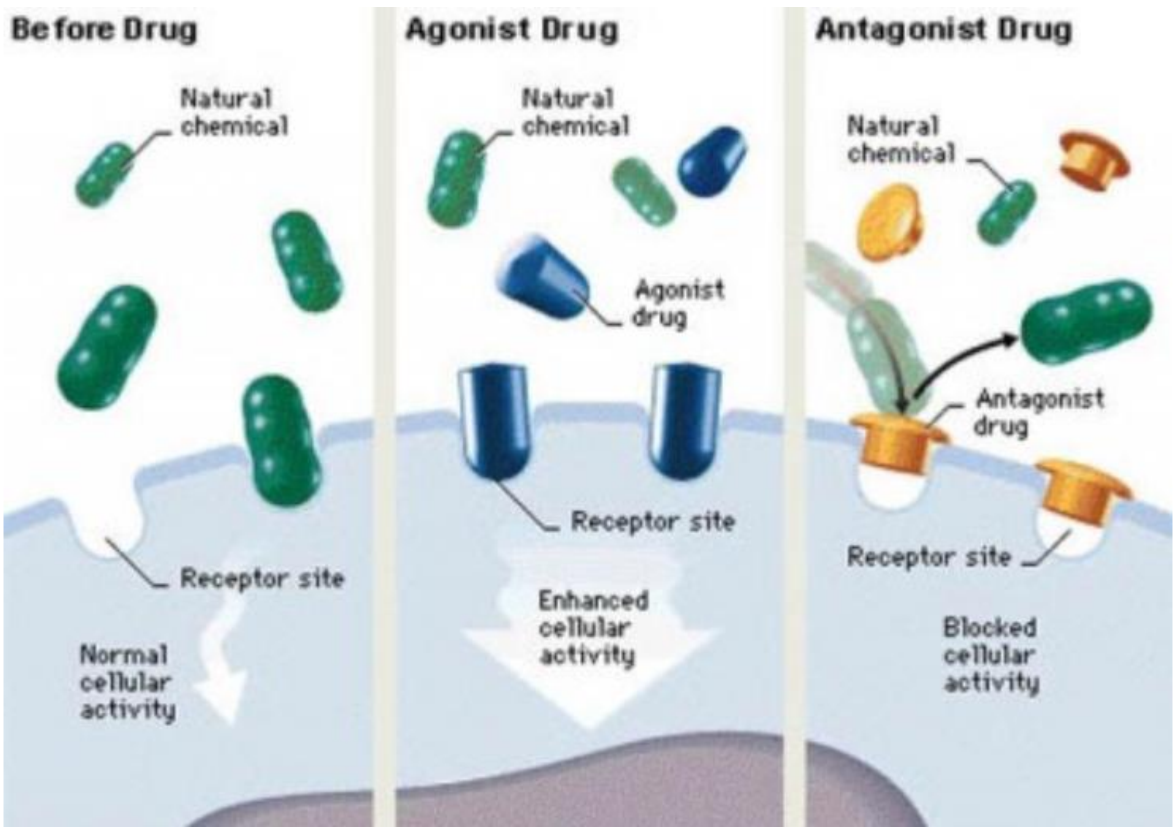


Structure of a typical chemical synapse © T. Splettstoesser

You can compare this whole process with a light switch, where the synapse is the light switch, and the cable to the light bulb is the axon.

If we dart an animal with an immobilizing drug, the drugs take effect in the synapses, and bind to the receptors. Specific drugs will only bind to a specific receptor, they can be considered as a *lock and key* – only the right key will open (bind to) the lock. There are 2 types of drugs that will bind to a receptor:

- Agonist drugs: these drugs like a specific receptor, and when it binds to that receptor, it will create an action (intrinsic activity). Processes in the cell start to happen, leading to a response.
  - Example: the immobilizing drug M99 modifies the cellular function in the nervous system, and the animal loses consciousness.
- Antagonist drugs: these drugs also like a specific receptor, but when it binds to that receptor, it will not create an action. An antagonist will disrupt the action that an agonist causes.
  - Example: the antidote Naltrexone blocks M99, and the animal regains consciousness.



Agonist vs. antagonist drugs © [Jo Humphreys]

So, when we dart an animal with an immobilizing drug, the drug will bind to a receptor, and creates an action, in this case it immobilizes the animal. The drugs 'sit' on the receptor, and when we do nothing, the animal stays immobilized, until the body starts 'removing' the drug by itself. When our work on the animal is done, we inject the antidote. This antidote has a stronger affinity to the same receptor than the immobilizing drugs ('the key fits the lock better'). The antidote basically 'kicks' the immobilizing drugs out of the receptor, and sits it its place (see picture above). Any action that the immobilizing drugs had, is blocked, and the animal wakes up. Most of the antidotes commonly used in wildlife medicine keeps on sitting in that receptor for about 24h. As a result of that, we cannot immobilize the animal again for that period of time. The antidote will prevent the immobilizing drugs entering the receptor.

When we release an animal in the field, we give the antidote injection in the vein. The antidote is rapidly transported to the receptor. The animal usually jumps up and runs away in less than a minute. When we wake up an animal in a crate or truck, we often inject the antidote in the muscle. It takes a bit longer for the antidote to be absorbed and to reach the receptor, but the animals wake up more gradually; they look around and usually carefully stand up. We don't want them to wake up being too excited, since they can jump and injure themselves. Note that sometimes the blood pressure is very low (due to the drugs), and a vein is then difficult to find. In that case we give the antidote injection in the muscle as well.

Occasionally it takes a bit longer before an animal gets up after we have given the antidote. There can be several reasons:

- Individual variations. Just like in humans, the one animal is just a bit slower than the other in waking up 😉
- We've experienced that the longer an animal has been immobilized (and thus has been lying), the longer time it takes to fully wake up and run off.
- Despite the immobilizing drugs, some animals are still very strong and difficult to handle. If the animal is too feisty, we might give it an injection with Ketamine as a top-up for the immobilizing drugs. There is no antidote for Ketamine, the body needs to metabolize and excrete the drugs by itself. It takes about 40 minutes before the drugs is 'worked out'. As we only give a small dose of Ketamine, and reverse the immobilizing drugs, the animal does wake up, but it might take a bit longer.
- When we transport animals to another (area on the) farm, we give it a long-acting tranquilizer, called Perphenazine. This is a long-acting tranquilizer, which we usually inject in the vein. It then immediately starts working and last about 7 days. The animals are calmer and more relaxed, and thus might take longer to get up.
- Sometimes not all of the antidote was injected into the vein, this sometimes happen when the animal moves or shakes during the injection.

DR ULF TUBBESING

P.O. BOX 50533, BACHBRECHT, WINDHOEK

+264 (0) 81 128 3050

ULFT@AFRICAONLINE.COM.NA

WWW.WILDLIFEVETSNAMIBIA.COM

FACEBOOK: WILDLIFE VETS NAMIBIA

YOUTUBE: WILDLIFE VETS NAMIBIA