

A close-up photograph of a person's hand operating a numnuts device. The device is a dual-action tool with a grey body and a yellow handle. A clear plastic cartridge containing a dark liquid is attached to the device. The label on the cartridge reads 'NumOcaine® Injectable Pain Relief', '17.2 mg/ml LIGNOCAINE', and 'numnuts'. The background is dark and out of focus.

numnuts®

A Detailed Guide

Primary Pain Relief for Tail Docking and Castration

- Dual-action tool for ring castration and tail docking of lambs
- Injects local anaesthetic and applies rings to lambs aged 2-12 weeks
- Ergonomic design for efficient workflow and easy operation
- Meets industry best practice guidelines and regulatory requirements



“As farmers, the welfare of our animals is paramount. Our livelihood is dependant on them, and likewise we have a responsibility to ensure we minimise their stress with all our farming activities.”

Julian von Bibra | Beaufront, Tasmania

Great for lambs, great for farmers

Numnuts® has revolutionised lamb marking in Australia. This patented dual-purpose device applies rings during tail docking and castration, while achieving significant pain relief through the injection of NumOcaine®, a local anaesthetic.

In a single, easy process, the ring is applied and the NumOcaine® dose is injected – once for females or twice for males. NumOcaine® starts numbing the site within one minute, making it the only injectable product to deliver pain relief where it's needed, when it's needed. It then lasts for up to an hour, covering the peak pain period 15 to 45 minutes after ring application.

Better for your lambs	Better for farmers	Better for your business
<ul style="list-style-type: none">• Local anaesthetic blocks pain when it's at its worst• Lambs show fewer pain related behaviours• Lambs mother up faster and mismothering is reduced	<ul style="list-style-type: none">• Easy to use• Safe, accurate injection• Efficient process during lamb marking• Ergonomic to reduce user repetitive stress• Small hand friendly	<ul style="list-style-type: none">• 'Future proof' against welfare regulations• In line with industry best practice guidelines• Approved for organic farms• Fits with wool accreditation schemes

Research shows just how much lamb marking pain is reduced when Numnuts® is used.¹⁻² The Numnuts® device and the primary pain relief benefits of NumOcaine® are scientifically evident. Numnuts® underwent rigorous research and development in Australia, with funding from the Meat and Livestock Agency (MLA) and Australian Wool Innovation (AWI). It has been through extensive clinical evaluation by CSIRO and the University of Melbourne with over 15,000 lambs tested. The device itself was engineered by 4c Design in Glasgow, with further research from the Moredun Research Institute.



Primary pain relief makes business sense

Current lamb marking practices are coming under increased scrutiny at home and abroad. Lamb marking without pain relief is increasingly viewed as inhumane by consumers, particularly when carried out on older animals. This has led to a growing trend to buy products that demonstrate improved animal welfare.

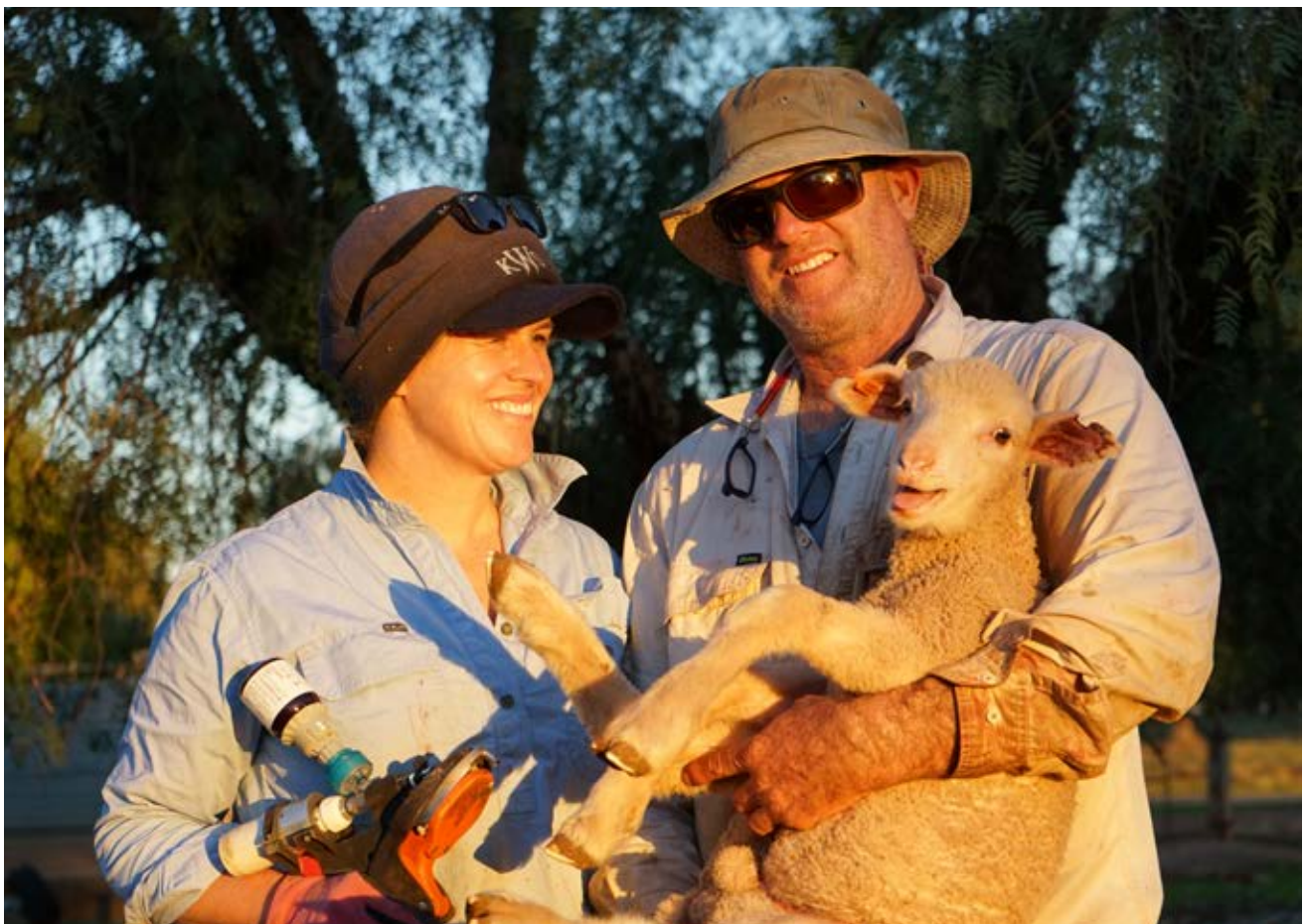
It's not only supermarket chains that are reflecting consumer expectations - increasing levels of

regulation are being introduced overseas that affect Australian and New Zealand wool and meat exports. While mulesing lambs has been the main focus to date, castration and tail docking without effective pain relief are coming into the welfare spotlight.

Why does this affect all farmers? Research shows that the application of rubber rings during castration and tail docking causes intense, acute pain within the first hour.¹ This is a direct and

rapid result of restricted blood flow (ischemia).

This is not a time to be complacent. Giving your lambs effective pain relief for ring marking today will serve to protect your business tomorrow. Being effective means using the correct medication at the right time: only a local anaesthetic injected during ring marking will block the intense pain that comes 15 minutes later.¹



Tail docking and castration should be accompanied by pain relief when practical and cost-effective methods become available.

G6.14 Australian Animal Welfare Standards



The accepted standard

Welfare regulations

The welfare of lambs is underpinned by the Australian Animal Welfare Standards and Guidelines for Sheep. These standards and guidelines are for the welfare of sheep and have been endorsed by all states and territories.

Meat and Livestock Australia (MLA), Australian Wool Innovation (AWI), Wool Producers Australia (WPA) and Animal Health Australia (AHA) all promote best practices that include the use of local anaesthetics during ring castration and tail docking.³⁻⁶ Numnuts® is the only producer-friendly method of administering a local anaesthetic, NumOcaine®, via the patented Numnuts® device.

‘For all methods of castration and tail docking, pain relief shall be applied (when suitable pain relief is available).’

Numnuts® and accredited wool & meat schemes

Demand for sheep products produced under accredited farming practices is increasing. Whilst accredited schemes vary in their specific requirements, a consistent theme throughout is a focus on best practices and high animal welfare standards. Numnuts® helps to achieve these goals by reducing the pain that accompanies these necessary husbandry procedures, thereby giving lambs the best start in life.



NumOcaine® for primary acute pain

NumOcaine® uses a formulation of 2% lignocaine, the same anaesthetic that many dentists use before extracting or drilling into a patient's teeth. In lambs, this powerful, fast-acting local anaesthetic addresses the immediate acute pain that follows ring marking.¹ Caused by the initial restriction of blood circulation ('ischemia'), this reaches a peak at around 15 minutes after ring application.

Studies show that lambs experience the most intense pain 15-45 minutes after ring application, when the initial restriction of the blood supply causes pain to rise to its peak level. In CSIRO trials led by Dr Alison Small, the injection of 1.5ml of NumOcaine (2% lignocaine) into the tail or scrotum of 2 to 4-week-old lambs brought a strong effect of pain relief within the first hour. Scientist observed up to a significant 68% reduction in pain-related behaviours in this timeframe using the Numnuts Device and NumOcaine.



Pain-related behaviours in lambs

In the first hour after marking, lambs display abnormal behaviours in an attempt to avoid feeling acute pain. These include kicking, foot stamping, 'bunny hops', and 'restlessness' (repeatedly getting up and lying down, or rolling from one side to the other). These behaviours tend not to be shown during the chronic phase, which is after the first 60 minutes.¹



Lying with stiff legs



Lying and rolling



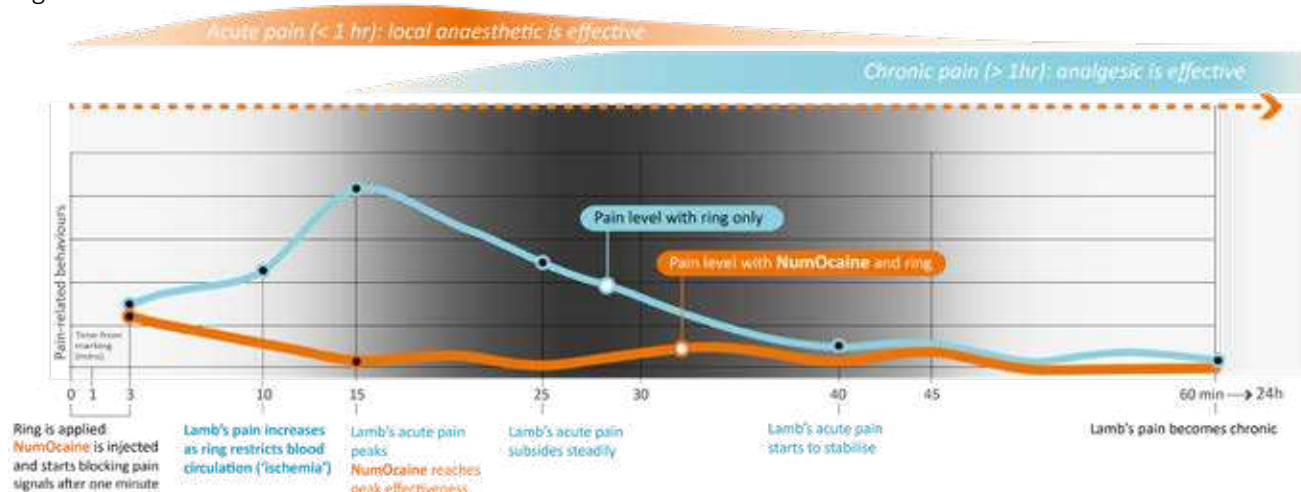
Standing hunched

“Pain is sometimes classified as immediate (fast) pain, and chronic (slow) pain. During painful animal husbandry procedures, there may be immediate pain associated with the procedure, as well as slower long-term pain associated with any injury and healing.”

Meat & Livestock Australia

Lamb pain behaviours with and without NumOcaine® local anaesthetic

Figure 1



Adapted from A.Small et al; (2021).

NumOcaine® effectively blocks nerve signals during the acute pain period in the first hour after marking.¹ After this time, the ring has largely disabled nerve (Ischaemia) function, and the lamb's pain decreases. This is when the slower long-term pain associated with injury and healing begins.⁴

Not all pain medications are the same: NumOcaine® is the only injectable local anaesthetic for ring marking. Other local anaesthetic treatments which also contain lignocaine are for applying to open wounds, so will not work with ring marking (closed wound).

The majority of pain relief products are analgesics (NSAIDs), in the same family as the human medication ibuprofen. These address the secondary, chronic inflammatory pain. NSAIDs take 15–30 minutes to take effect, and generally provide pain relief for at least nine hours, but often longer. For example, Colditz et al (2019) reported meloxicam's maximal effect 6–9 hours post treatment.⁹ It is, however, possible to use NumOcaine® in a combined approach with an analgesic, meeting industry guidelines for best practice.³



The Numnuts® system

NumOcaine® Quick Change Cartridge (QCC)

A tamper-resistant QCC and 100ml bottle are supplied as a single unit to speed up changeovers and minimise the risk of drug misuse. 65 procedures are covered per 100ml bottle.

Fluid junction and o-ring seal

Changing the fluid junction every 2,000 lambs or each season (whichever comes first) allows for hygienic and effective function.

Needle

Regular changeover of the high quality stainless steel needle reduces infection risk, minimises animal discomfort, and keeps injection loads low for the operator. Replacement is recommended after every second NumOcaine® bottle (130 procedures). The size, gauge and type of needle is critical for the correct operation of the tool. Therefore, only use Numnuts® needles to achieve the full effect of the procedure.

2-stage injector

The patented 2-stage injector delivers a pre-calibrated 1.5ml dose of NumOcaine®. The mechanism will only dispense the NumOcaine® once the needle is correctly engaged.

Ring applicator

This is ergonomically designed for the professional farmer or marking contractor. It is engineered to be a robust 'accident-proof' tool lasting over 100,000 ring applications.



Using Numnuts®

Shown on a demonstration rig



Step 1

With the ring in place, open Numnuts® tool and position ring over the tail or testes.



Step 2

Release pressure on metal lever to close ring, which automatically aligns the tool for injection.



Step 3

Press injector plunger firmly. The two-stage mechanism first pushes the needle through the skin, then delivers a calibrated 1.5ml dose.



Step 4

Release plunger and tilt down. Pull tool up to release ring.

Note: This is different (easier) than standard elastrator ring pliers.

Scan the QR code to learn more about how to use Numnuts®



Designed for the farmer

Safe to use

- + **Needle safe:** the needle automatically retracts after each application.
- + **Tamper-resistant** Quick Change Cartridge reduces risk of drug misuse.
- + NumOcaine® has a very wide **safety margin** with few side effects.

Ease of Use

- + The ring is applied and the targeted local anaesthetic administered with the same **dual action device**.
- + The unique pre-set system ensures an **exact 1.5ml** dose of NumOcaine® is delivered accurately to the **correct place**, every time.
- + The **ergonomic** design means the operator does not need to twist the forearm through 90°, reducing fatigue and risk of Repetitive Strain Injury (RSI).
- + **Minimal force** is required to hold device fully open, making it easy for operators with varied hand sizes and strengths to use.
- + It is perfectly designed for **left or right handed** use.

Purchasing NumOcaine®

NumOcaine® comes in an individually packed, 65 dose, 100ml NumOcaine® bottle. NumOcaine® comes with the Quick Change Cartridge (QCC) factory fitted, which has been engineered to be tamper-resistant. It also allows broaching and changing to a new bottle of NumOcaine® local anaesthetic easier for the farmer.

Safe

The QCC acts as tamper security to limit access to the local anaesthetic when the bottle is not attached to a Numnuts® device. There is no risk of injury from the sharp broaching spike due to it being contained within the QCC.

Tube-free

The QCC technology removes the need for cumbersome tubes that can get in the way or become entangled with other equipment or the lamb's legs.

Fast setup

The QCC technology enables fast broaching and attachment to the Numnuts® device.

www.numnuts.store

NumOcaine® 65 Doses

Contains:

- 1 x 100ml bottle
- 1 x APVMA approved datasheet for retail

Sold individually.



NumOcaine® Information

Number of doses per bottle (expected)	65
Fixed dose volume dispensed via Numnuts® device	1.5ml
Storage temperature (refrigeration not required)	<30 deg
Shelf life after opening	7 days
NumOcaine® expiry date from manufacture	2 years
Withholding Period (WHP)	0

As a Schedule 5 drug, NumOcaine® may be sold over-the-counter for use with the Numnuts® applicator if regulations around packaging, labelling and datasheet provision are followed correctly.

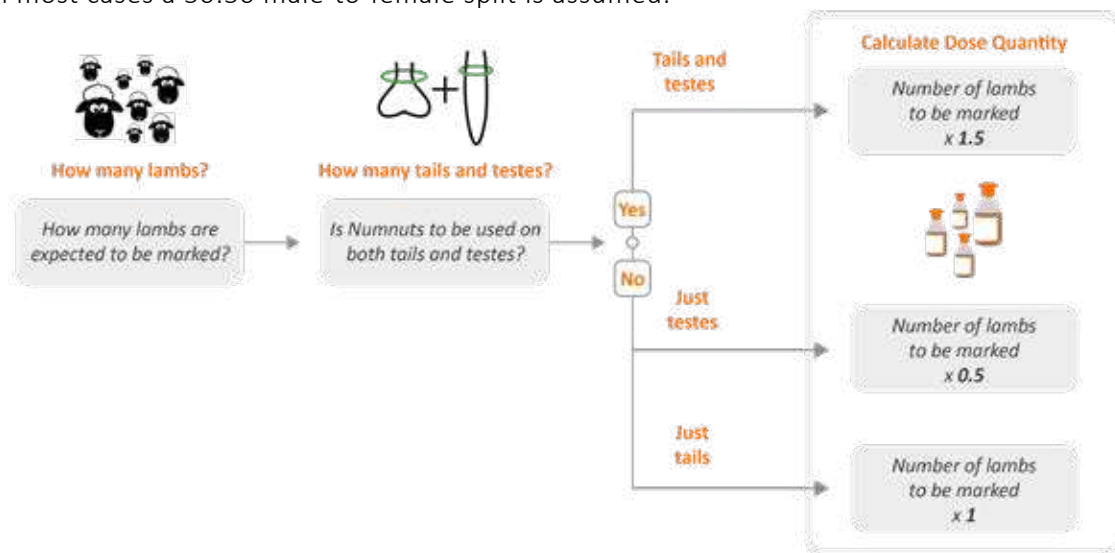
Selling NumOcaine® outside designated constraints is a violation of the APVMA code and may lead to significant fines.

Refer to current price list for up-to-date minimum order quantities and prices.

Calculating NumOcaine® quantities

How much NumOcaine® is required depends on two factors: how many lambs are being marked, and whether the rings are being used for both castration and tail docking.

In most cases a 50:50 male-to-female split is assumed.



How much NumOcaine® does Barry Baws require?

Barry Baws from Long Tail farm is predicting 7,500 lambs in June.

He usually gets around 50:50 male and female and is considering his options for primary pain relief, and whether to use Numnuts® and NumOcaine® on both tails and testes.

Here's how much Mr Baws will need for using NumOcaine® on both tails and testes.	Number of doses required $= 7,500 \text{ (number of lambs being marked)} \times 1.5$ $= 11,250 \text{ doses}$	This amounts to 174 x 65-dose packs . Mr Baws will have enough to do the 11 250 doses with some to spare just to be safe.
Here's how much Mr Baws will need for using NumOcaine® just testes (ie. castrating males, no tail docking with rings).	Number of doses required $= 7,500 \text{ (number of lambs being marked)} \times 0.5$ $= 3,750 \text{ doses}$	This amounts to 58 x 65-dose packs . Mr Baws will have enough to cover his flock and some spare to be safe.

Cost per dose can be found on the latest price list.

On page 10-11, we cover exactly what is needed to ensure the annual lamb marking operation is equipped with the correct amount of hardware, spares and (especially) needles. This takes into account the number of lambs to be marked and procedures to be carried out, so an accurate estimate is important.

Numnuts® is the practical solution

Numnuts® was developed and tested on Australian farms and has been put through its paces since its launch in 2019. Numnuts® has a wide-ranging user base, from lifestyle farmers to large-scale commercial producers with thousands of lambs. The Numnuts® system uses standard elastrator rings. What is different is the injection of local anaesthetic NumOcaine® during marking. This means other factors should be considered when preparing your marking set-up.

Changing NumOcaine® bottles is fast with no fuss due to the patented Quick Change Cartridge (QCC). Knowing the mob size, prepare your NumOcaine® in advance of the marking session.

Make sure you don't drain the system between bottles so you don't have to prime at every bottle change.

Add a **second device** to speed up the process. Either have a second device loaded with NumOcaine® primed and ready to go or, when marking both testes and tails, consider a device for each procedure at two different stations.

A **device holder** helps to keep the Numnuts® tool upright and accessible when not in use. Producers have suggested their own DIY device holders which work in various making scenarios.

They are simple and versatile – scan the QR code to see how to set up a device holder.

Injecting tails and testes is explained in detail on page 12. However, producers should be aware of what to do when the needle hits the bone of the tail or encounters creased skin on the scrotum.





Tips on how to use Numnuts® in these situations can be found on the Numnuts® website or by scanning this QR code.

Numnuts® has been designed to be used with **all types of cradles**: single cradles, rotary cradles, cradles in a line, vet markers, and even someone presenting the lamb on their knees. The only thing that matters is that the lamb's testes and tail are facing upwards, ie, the lamb is on its back .



Plan ahead and be organised

The Numnuts® kit needs to be looked after and maintained like any other tool or drug delivery device used during lamb marking. The Numnuts® system is modular so parts can be replaced easily with spares.

Part	Description
 <p>Numnuts® device AD0100</p> <p>Numnuts® ring applicator with pre-set injector and fluid junction.</p>	<p>The Numnuts® ring applicator is engineered to last hundreds of thousands of uses. A modular design allows the 2-stage injector and fluid junction to be changed more frequently, as required.</p>
 <p>Fluid junction AS0100</p> <p>Numnuts® fluid junction with two replacement O-rings.</p> <p>Purchase separately.</p> <p>Replace seasonally or 2,000 procedures.</p>	<p>Due to the physical demand on this part, it is recommended that a spare is always available.</p> <p>It is important to maintain a high level of hygiene. Letting wet and uncovered fluid junctions sit around can lead to the build-up of mould and dust that can contaminate NumOcaïne®.</p> <p>Two replacement O-rings are included to ensure spares are available for the 2-stage injector.</p>
 <p>2-stage injector AS0200</p> <p>Numnuts® 2-stage injector.</p> <p>This is designed to last over 5,000 procedures, but it is recommended to always have a spare on hand.</p>	<p>The 2-stage injector is a robust assembly, however, like any mechanism, it will suffer from wear and tear. It can be maintained by regular cleaning and by replacing the O-ring every season or if visible wear can be seen.</p> <p>O-rings should be lubricated with a cooking oil such as olive oil.</p> <p>When replacing a 2-stage injector it is important to follow the manufacture's instructions to ensure the maximum needle depth is not exceeded. When the injector is pressed fully, the tip of the needle must be set to protrude between 11 and 12mm from the device.</p>
 <p>Numnuts® needles AD0300</p> <p>Needles come in trays of 12 needles.</p> <p>It is recommended that needles are changed every 2 bottles (130 doses).</p>	<p>Blunt needles are uncomfortable for the lambs. Hygiene levels must also be maintained.</p> <p>The Numnuts® needles are unique to the Numnuts® system. The specification is fundamental to the effectiveness of Numnuts® and the welfare of the lamb. Third-party / off-brand needles are unsuitable for use with the Numnuts® device.</p>

Cleaning

Your Numnuts® device should be cleaned at the end of each day of marking, and at the end of the season. This allows for a good level of hygiene and prevents carrying any soil or faecal-borne diseases or pests.

1. Wash with hot soapy water to remove dirt and clear the moving parts.
2. Use dry silicon spray on the injector mechanism and ring applicator. Do not lubricate the O-ring with a synthetic or non-food grade lubricant.
3. To keep the injector leak free and moving freely, apply cooking oil to the O-ring that sits at the end of the injector and inside the fluid junction.
4. Store hardware out of sunlight to preserve the plastic's mechanical properties.

Scan the QR-code for tips on cleaning and maintenance



NumOcaine® label

Benefits. Clinical trials showed NumOcaine® reduced pain from ring marking significantly. Scientists at CSIRO reported a 68% reduction in pain-related behaviours in lambs for up to 60 minutes.¹⁰ The use of Numnuts® with NumOcaine® also improves mothering up.¹

Indications. NumOcaine® is a local anaesthetic injection for sheep during castration and tail docking with rings.

Precautions. Safety studies have only been conducted up to two times the dose in 2-10 week old lambs. Use with caution to avoid overdosing.

Restraints. DO NOT:


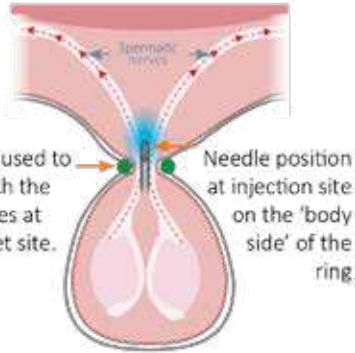
- Use for any other purpose other than the purpose approved on product label.
- Tamper with or remove the Quick Change Cartridge collar from the bottle.


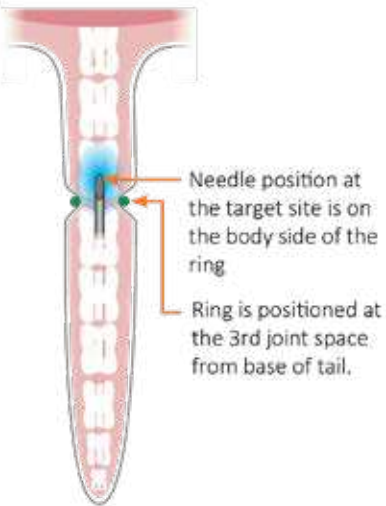
USE ONLY with the Numnuts® device.

Dosage & Administration. Each injection delivers 1.5ml.

Administer according to the directions provided with the Numnuts® applicator device in conjunction with rubber ring application for tail docking and castration.

The injection must be administered under the skin (subcutaneously) at the dorsal midline at the third palpable joint for tail docking or dorsal midline of the scrotum for castration with the Numnuts® applicator, as illustrated in the diagrams.

Dispensing Local Anaesthetic for Castration	
Correct Position of Device	Numnuts® Target Site
	
Position the lamb on its back in the cradle, with its tail nearest the operator.	Numnuts® technology deposits the anaesthetic at the target site consistently.
Apply the ring with the device. The ring bunches nerves together at the target site.	When the device is held in position, the needle is sitting on the testicles side of the ring. When user presses the dual stage injector, the needle injects NumOcaine® on the body side of the ring, anaesthetising the nerves.
Next, press the dual stage injector as shown. The device automatically extends and angles the needle to the correct position, injecting NumOcaine® on the body side of the ring.	

Dispensing Local Anaesthetic for Tail Docking	
Correct Position of Device	Numnuts® Target Site
	
Position the lamb on its back in the cradle, with its tail nearest the operator.	Needle position at the target site is on the body side of the ring
Apply the ring with the device. The recommended location is the 3rd or 4th joint space, felt by hand.	Ring is positioned at the 3rd joint space from base of tail.
The device automatically extends and angles the needle to the correct position, injecting NumOcaine® on the body side of the ring.	Numnuts® technology deposits the anaesthetic at the target site consistently.



“If you are currently doing nothing in terms of pain relief during lamb marking, then it is time to start doing something.”

Dr. Alison Small BVM&S | CSIRO



www.numnuts.store

References

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10. Internal data on file

Figures

Figure 1: A. Small et al; Local anaesthetic delivered with a dual action ring and injection applicator Numnuts reduces the acute pain response of lambs during tail docking; Animals 11(8):2242; Aug 2021



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