



74th Annual Meeting EAAP + WAAP + Interbull Congress 2023

Lyon, France - August 26th / September 1st, 2023

Percutaneous liver biopsy obtention by ultrasonographic guidance in small ruminants

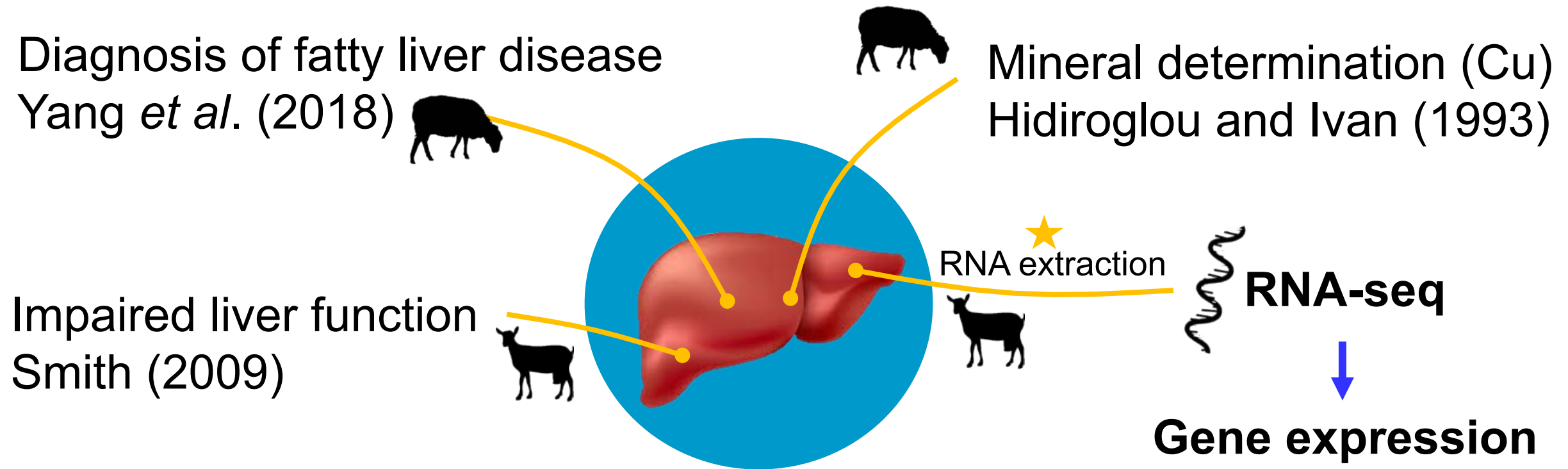
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Introduction. Liver biopsy applications



Most of the studies describing liver biopsy technique → dairy cattle
Impact of the biopsy procedure on milk yield?

Introduction. Liver biopsy techniques

Laparoscopy

Philippo (1973)
Hidiroglou and Ivan (1993)
Kassem *et al.* (2011)

Percutaneous

Needle aspiration

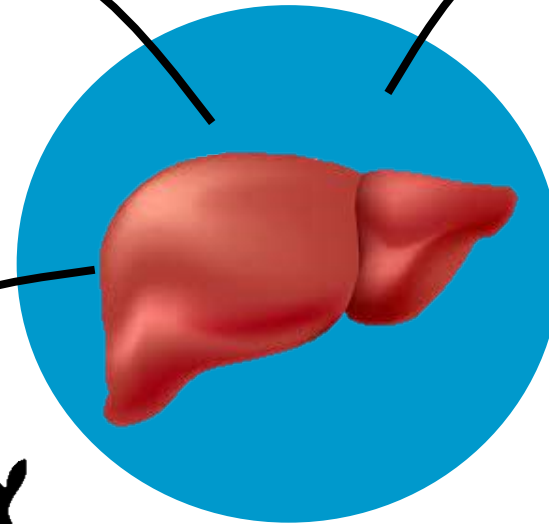
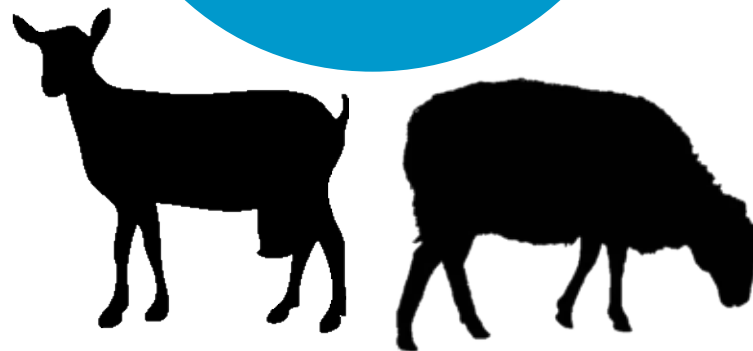
Cruz *et al.* (2005)

Tru-Cut needle

Ferreira (1996)

Laparotomy

Ledoux *et al.* (1995)



Objectives

- Describe a percutaneous liver biopsy procedure for dairy goats and ewes.
- Detect liver biopsy effects on milk yield.
- Obtain RNA quality values from liver specimens for potential RNA-seq.



Materials & methods. Animals



Manchega dairy ewes

- 68.6 ± 1.2 kg BW
- 199 ± 8 DIM
- 0.66 ± 0.06 kg/d milk



Murciano Granadina dairy goats

- 42.4 ± 1.3 kg BW
- 141 ± 4 DIM
- 1.88 ± 0.08 kg/d milk

Management. Individual sawdust bedded pens (1.75×0.90 m) and 2 × milking (portable milking machine).

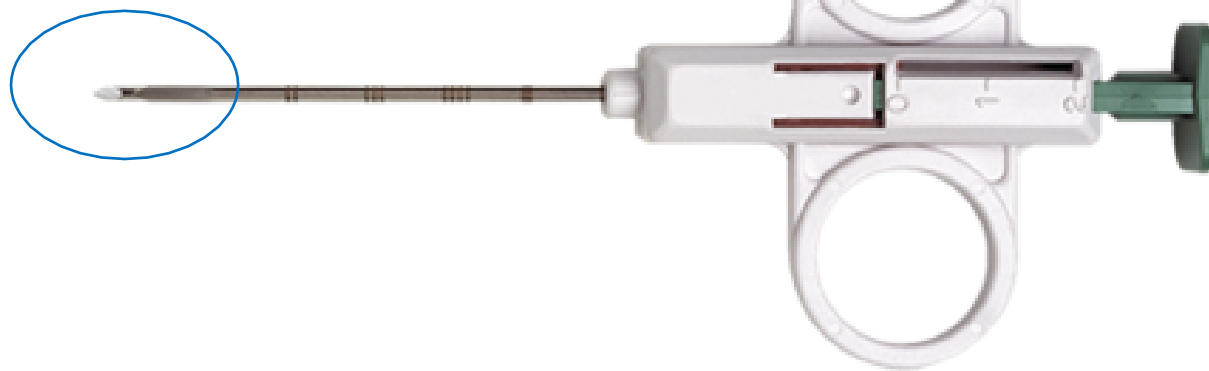
Materials & methods. Ultrasound

- Real time B-mode ultrasound.
- Convex probe C60/5-2 MHz.



Materials & methods. Biopsy instrument

- VI Trucut type SuperCore
- Semiautomatic 14 G × 9 cm
- Echogenic tip



Close



Stylet

22 mm
specimen
notch

Canula

Open

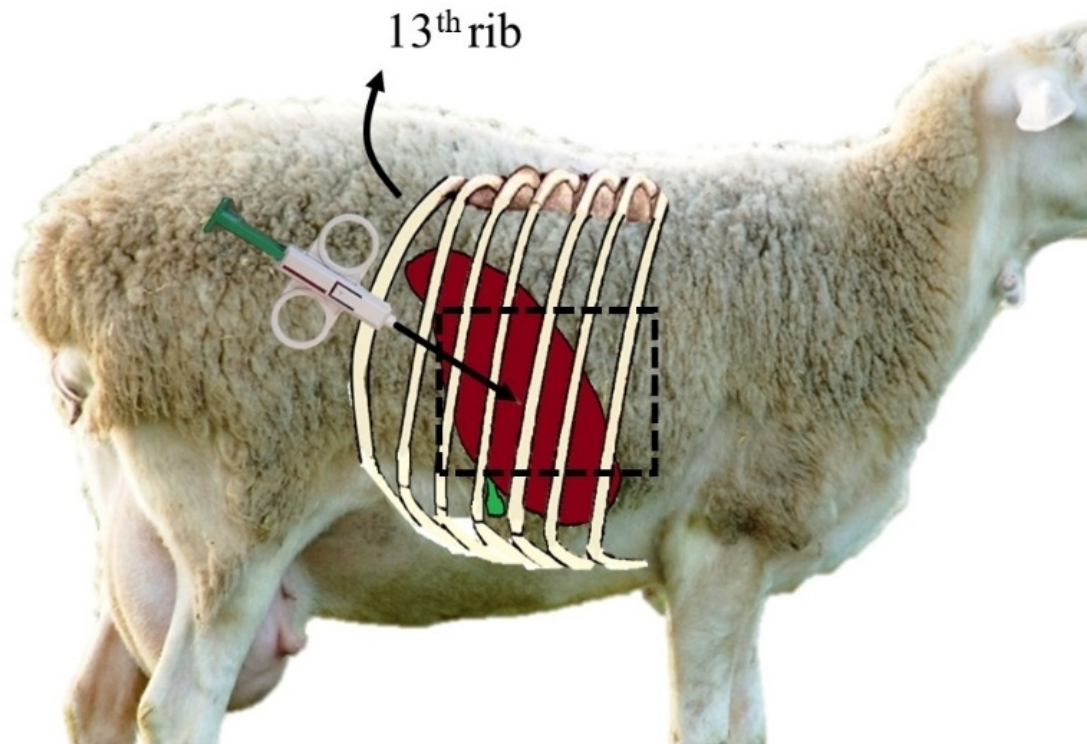
Materials & methods

- Syringes
- Gloves
- Gauze
- Scalpel blade
- Surgical stapler
- Antiseptic (chlorhexidine 2% with isopropanol 70%)
- Alcohol 96°



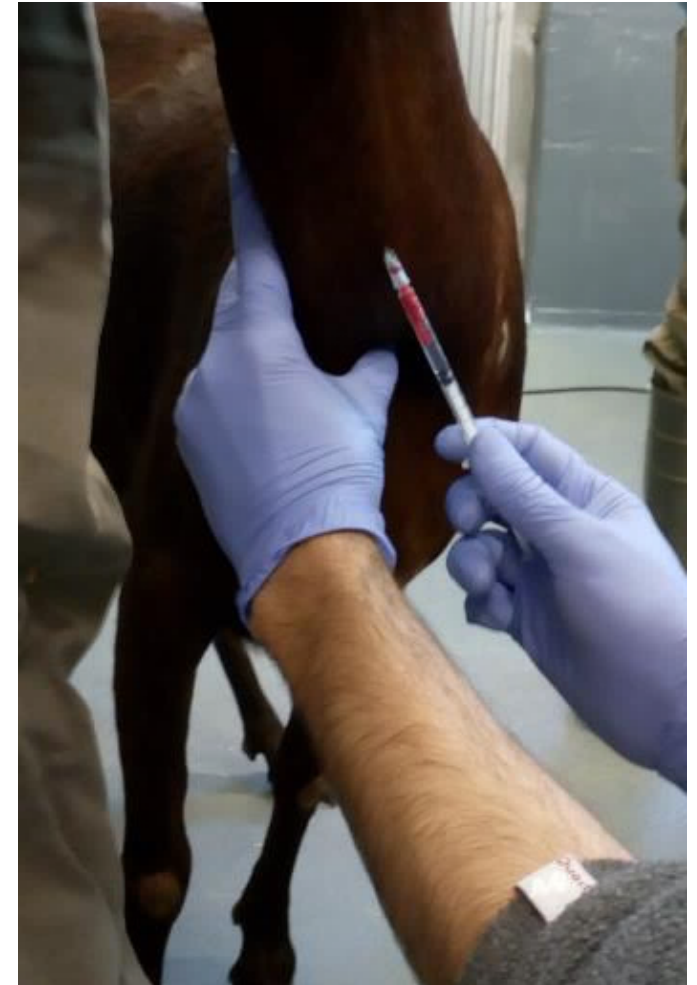
Materials & methods

- Shaving of puncture zone (7th to 11th intercostal spaces).

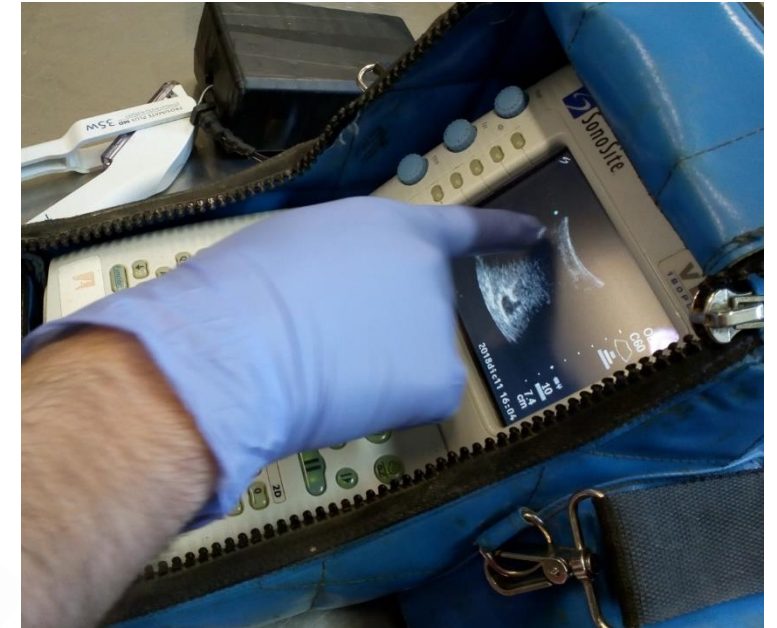
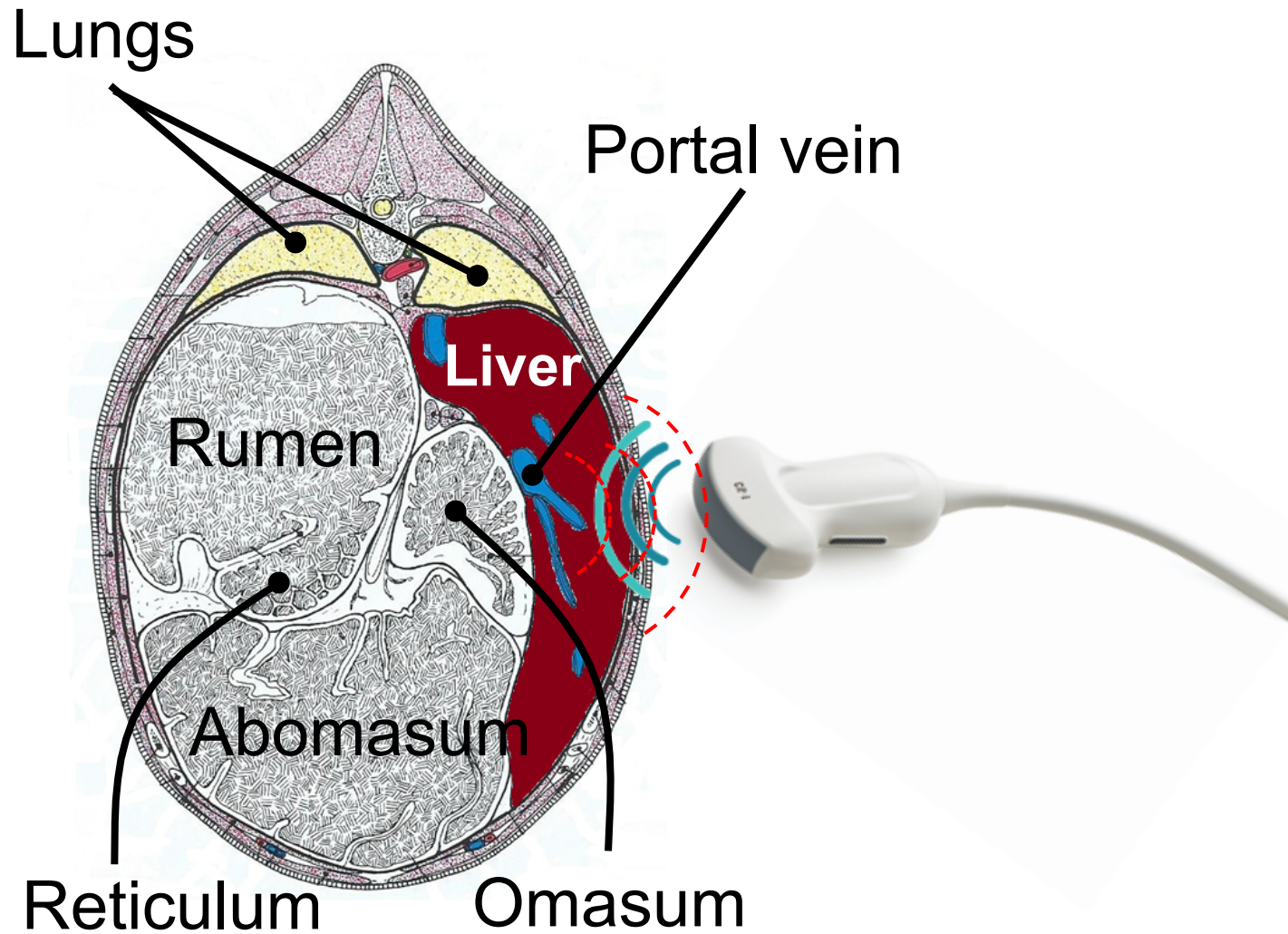


Materials & methods

- Sedation
(0.15 mg/kg BW of xylazine hydrochloride)
- Animals were positioned in left lateral recumbency.

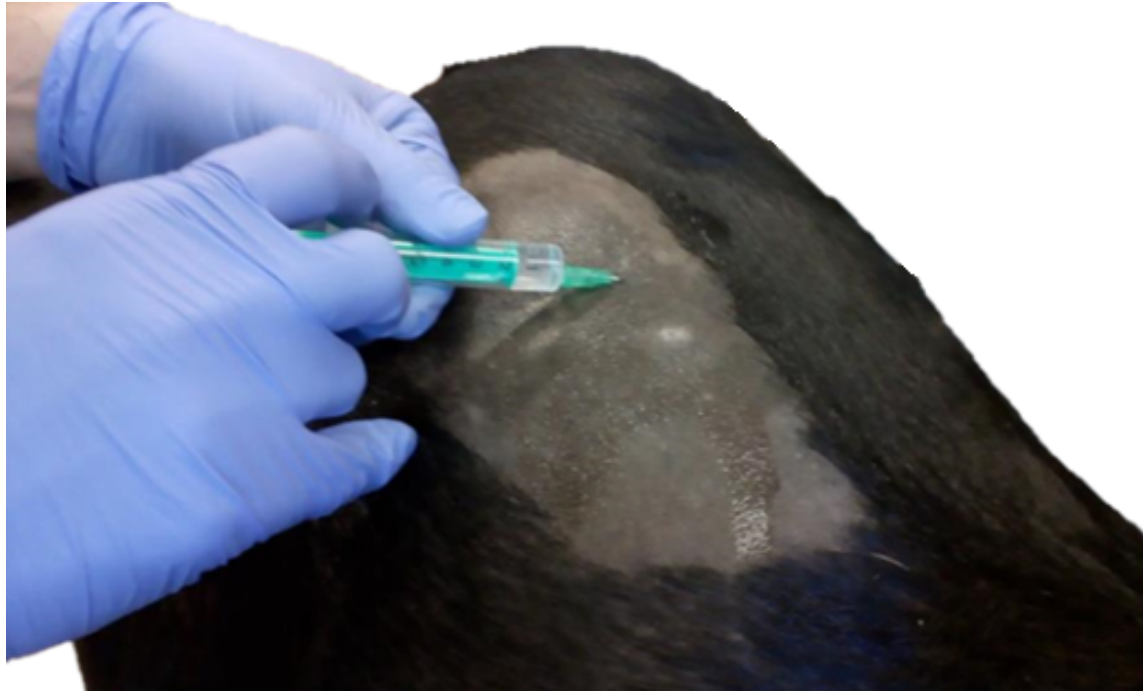


Materials & methods. Liver visualization



Materials & methods

- 1st wash and antiseptis of the area.
- Infiltrative local anesthesia (Lidocaine 2%).



Materials & methods

- Skin incision.
- Antisepsis of the area.

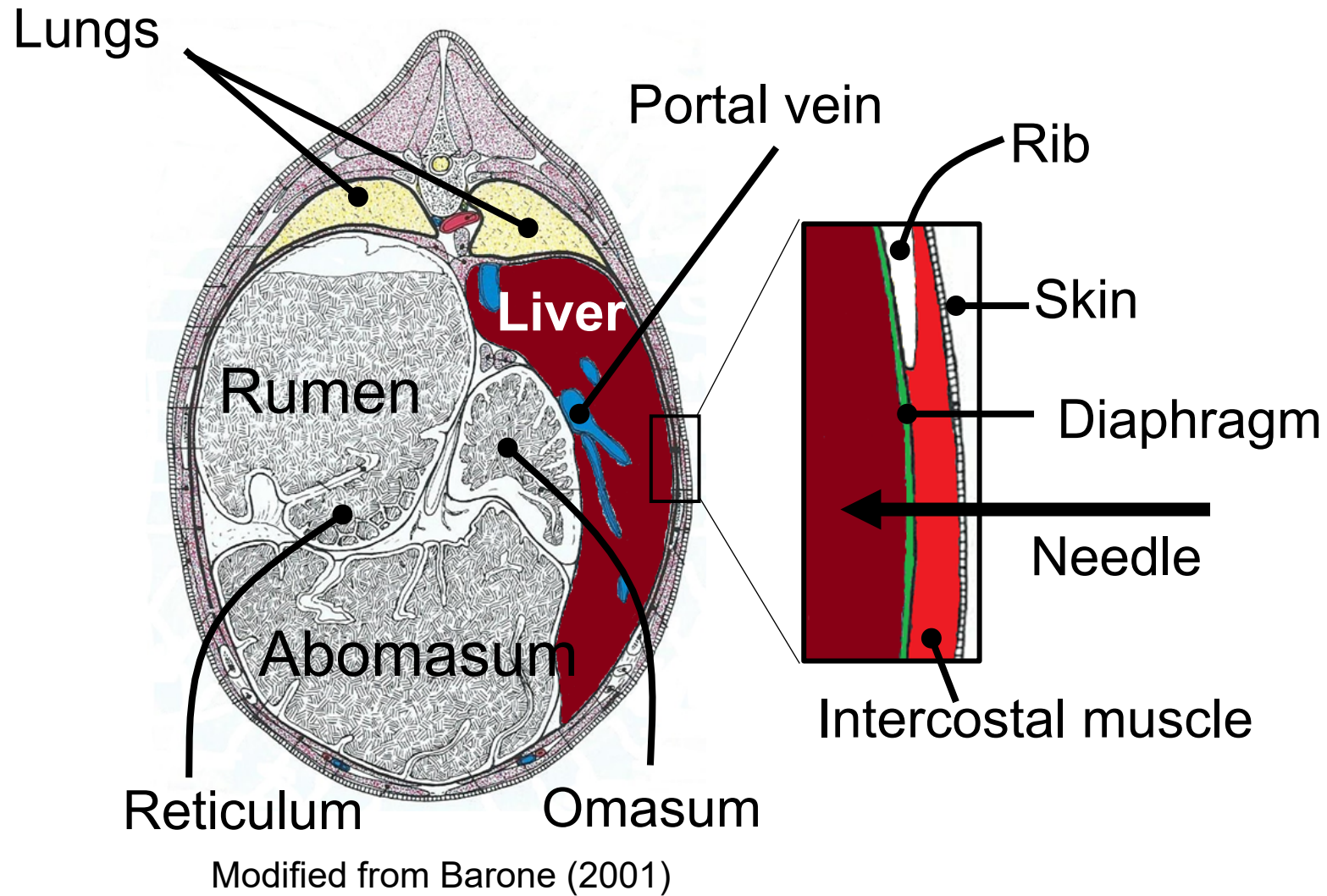


Materials & methods

- Needle insertion



Materials & methods



Materials & methods. Tru-Cut needle steps



1. Needle insertion (retracted stylet)

Materials & methods. Tru-Cut needle steps



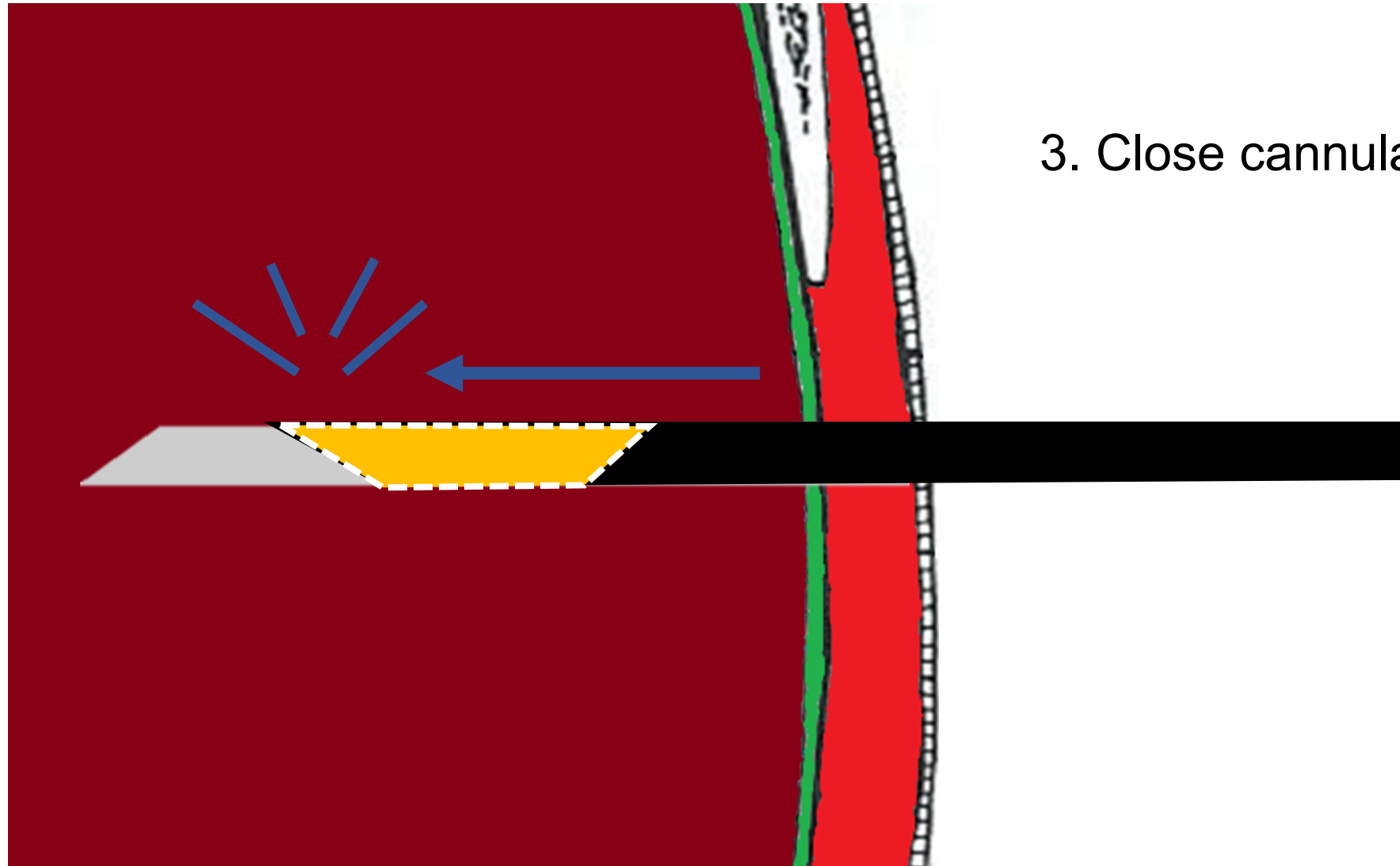
2. Advance stylet

Materials & methods. Tru-Cut needle steps



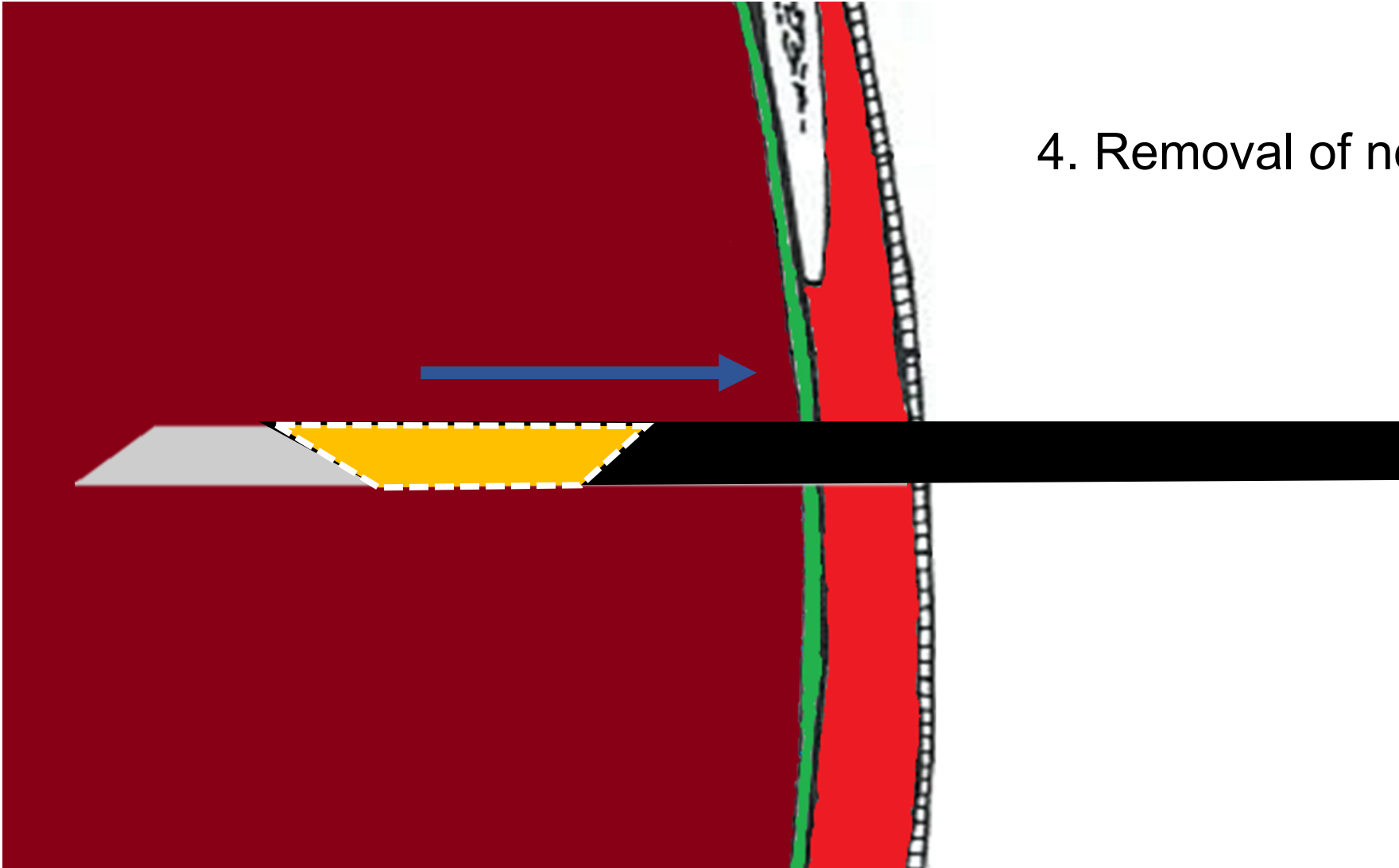
2. Advance stylet

Materials & methods. Tru-Cut needle steps



Materials & methods. Tru-Cut needle steps

4. Removal of needle



Materials & methods

- Liver specimen 2.2 cm



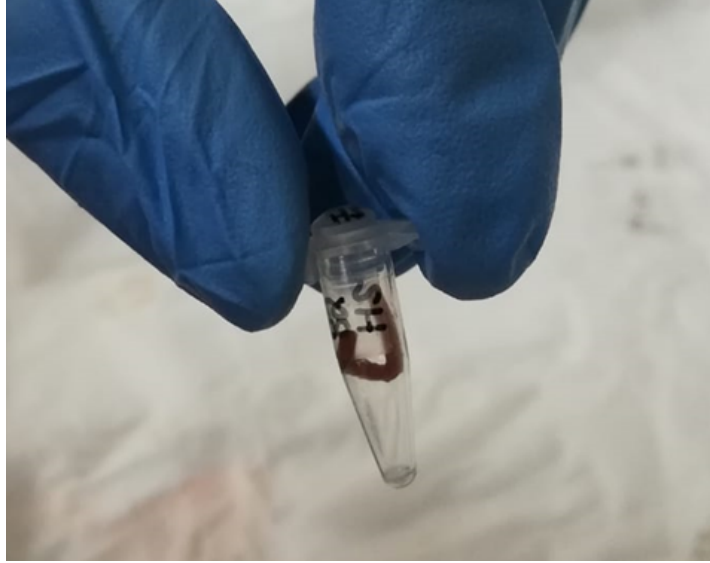
Snap freezing in liquid N
and stored at -80°C .

Materials & methods

- Staple application and removal (10 d after biopsy).
- Flunixin (2.2 mg/kg BW via IM every 24 h for 2 d).



Materials & methods. RNA



Liver
specimen

- 24 ± 6 mg
(on average)



 RNA
extraction

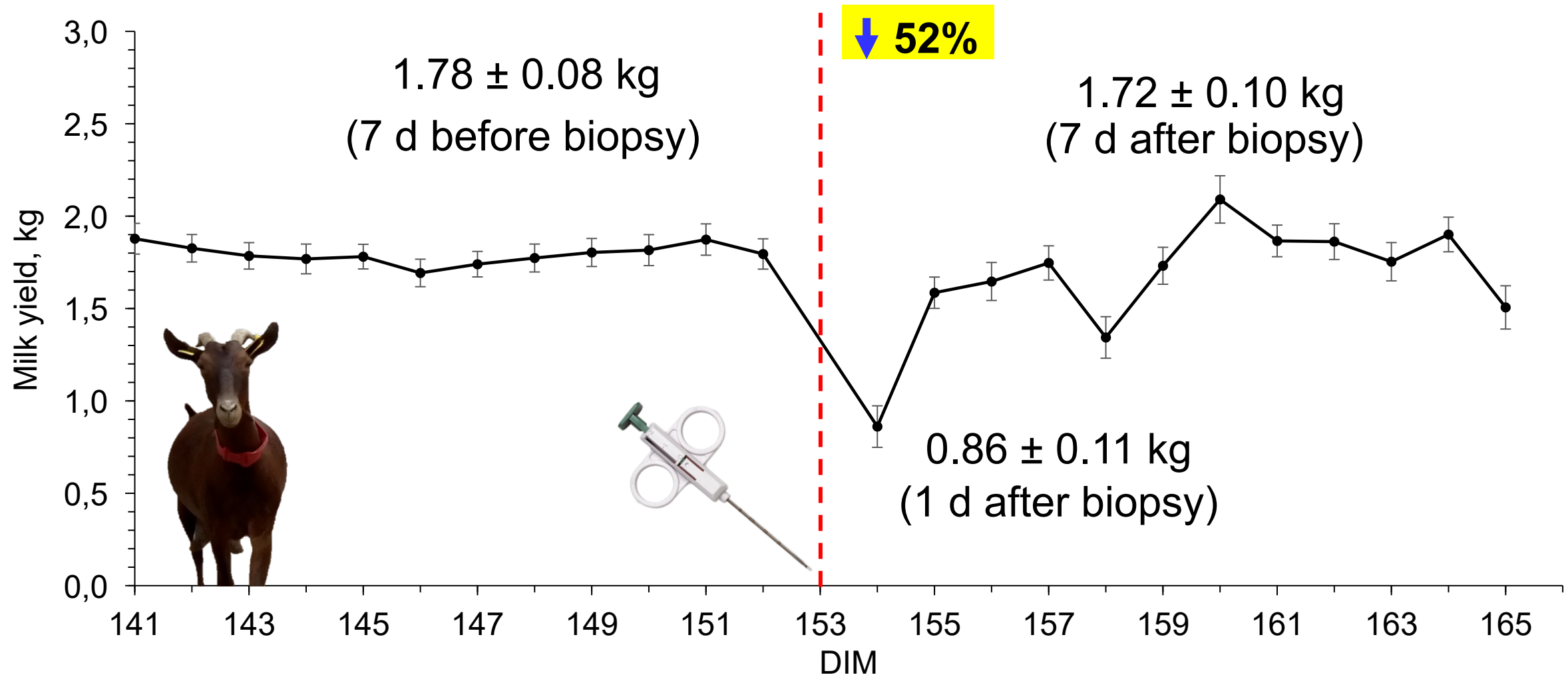
- TRIzol® Reagent
- PureLink™ RNA Micro
Kit



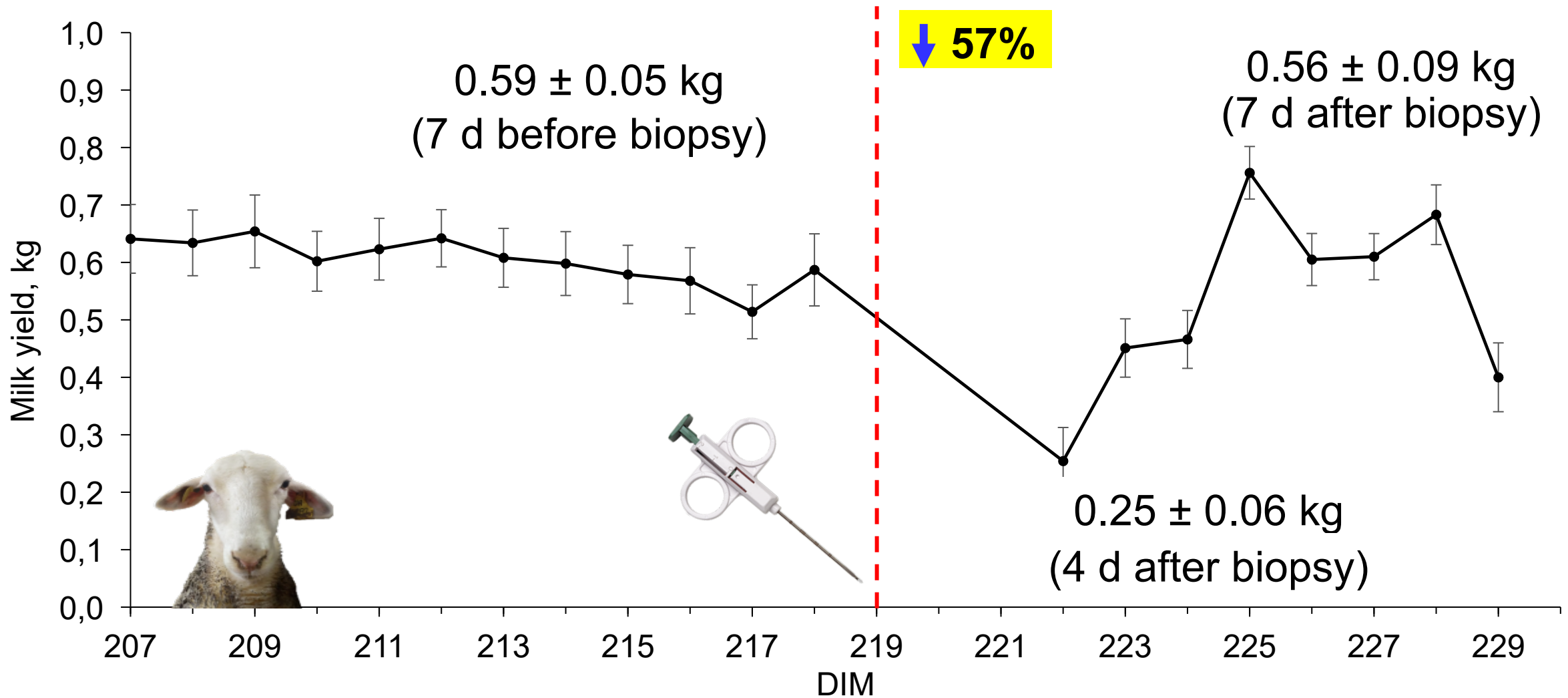
 RNA concentration &
purity

- NanoDrop™ 2000
spectrophotometer

Results. Milk yield goats



Results. Milk yield ewes



Results. RNA values

$1313 \pm 102 \text{ ng}/\mu\text{L}$

Concentration

$2.06 \pm 0.00 \text{ A260/280}$

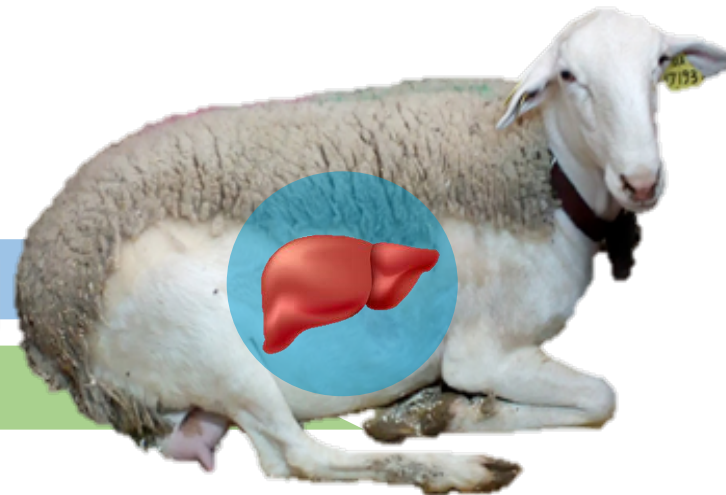
Purity

Concentration

$246 \pm 52 \text{ ng}/\mu\text{L}$

Purity

$2.00 \pm 0.01 \text{ A260/280}$



Conclusions

- Liver biopsying **reduced milk yield** in goats (–52%) and ewes (–57%).
- Goats **recovered milk yield** 4 d after biopsying whereas ewes needed 7 d.
- Liver specimens from **goats** had **more RNA concentration** than ewes and **similar purity**.
- Liver specimens **were suitable for RNA-seq analysis**.
- **The use of ultrasound-guided technique for liver biopsying in dairy small ruminants is recommended.**



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Thanks for attention!

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