

Submission ID #: 67181

Scriptwriter Name: Sulakshana Karkala

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Title: Anchorage of Twisted Testis: A Rat Model of Ischemia Reperfusion Injury of the Testis

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Author Questionnaire

1. We have marked your project as author-provided footage, meaning you film the video yourself and provide JoVE with the footage to edit. JoVE will not send the videographer. Please confirm that this is correct.

✓ Correct

2. Microscopy: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **NO**

3. Software: Does the part of your protocol being filmed include step-by-step descriptions of software usage? **NO**

4. Proposed filming date: To help JoVE process and publish your video in a timely manner, please indicate the proposed date that your group will film here: THIS HAS BEEN SUBMITTED TO JoVE

When you are ready to submit your video files, please contact our Content Manager, [Utkarsh Khare](#).

Current Protocol Length

Number of Steps: 10

Number of Shots: 19

Introduction

NOTE to VO: Please record introductory and conclusion interview statements.

INTRODUCTION:

~~What is the scope of your research? What questions are you trying to answer?~~

- 1.1. **Oladele Afolabi:** This research focuses on a mouse model grafting brown fat onto the heart to investigate epicardial fat function, disease impact, and cardioprotective mechanisms.

- 1.1.1. [2.6.2.](#)

~~What are the most recent developments in your field of research?~~

- 1.2. **Oladele Afolabi:** Recent research shows improved testicular detorsion outcomes using adjuvant antioxidant therapies to reduce ischemia-reperfusion injury and preserve overall tissue function.

- 1.2.1. [2.5.1](#)

CONCLUSION:

~~What significant findings have you established in your field?~~

- 1.3. **Oladele Afolabi:** A reliable testicular torsion–detorsion model that closely replicates human pathological events has been established, enabling accurate investigation of injury mechanisms.

- 1.3.1. [2.7.2](#)

~~How will your findings advance research in your field?~~

- 1.4. **Oladele Afolabi:** This model offers a simple, reproducible technique that mimics human conditions, providing a reliable foundation for studying pathological mechanisms underlying IRI.

- 1.4.1. [2.4.2](#)

~~What new scientific questions have your results paved the way for?~~

- 1.5. **Oladele Afolabi:** These findings raise new questions about the molecular pathways driving early injury responses and the factors that govern reproducibility across testicular torsion models.

1.5.1. [2.8.1](#)

Ethics Title Card

This research has been approved by the Ethics Review Committee of the Faculty of Basic Medical Sciences, Ladoke Akintola University of Technology

Protocol

2. Surgical Induction and Anchoring of Testicular Ischemia in a Rat Model of Torsion/Detorsion

Demonstrators: Oladele A. Afolabi, Johnson O. Odesanya, Richard A. Ajike, Olubunmi S. Oyekunle, Babatunde A. Alabi, Olajumoke D. Ogunleye, Roland E. Akhigbe

The Protocol was scripted from footage provided by the authors

- 2.1. To begin, apply gentle pressure to the abdomen of an anesthetized male rat to guide the left testis into the scrotum [1]. Firmly grasp the left testis of both groups and make a high scrotal incision approximately 1.5 centimeters long to expose the testis within the tunica vaginalis [2].
 - 2.1.1. FILE: MP4_A rat model of torsion of the testis 00:08 – 00:18
 - 2.1.2. FILE: MP4_A rat model of torsion of the testis 00:20 – 00:33
- 2.2. Locate the cauda epididymis at the lower pole of the testis in both groups and use small dissecting scissors to nick the tunica vaginalis [1].
 - 2.2.1. FILE: MP4_A rat model of torsion of the testis 01:49 – 01:58
- 2.3. Now, place the scissors under the tunica vaginalis and open them slightly to separate the edges [1], then grip each edge with curved mosquito artery forceps [2].
 - 2.3.1. FILE: MP4_A rat model of torsion of the testis 02:04 – 02:10
 - 2.3.2. FILE: MP4_A rat model of torsion of the testis 02:11 – 02:32
- 2.4. Extend the tunica vaginalis incision proximally by approximately 0.5 centimeters in both groups [1]. Then exert gentle pressure on the lower abdomen to exteriorize the testis in both groups [2].
 - 2.4.1. FILE: MP4_A rat model of torsion of the testis 02:38 – 02:42
 - 2.4.2. FILE: MP4_A rat model of torsion of the testis 02:43 – 03:00
- 2.5. Mobilize the testis for only the torsion/detorsion (*torsion-detorsion*) group [1], locate the gubernaculum, and cut it to detach the testis from the scrotal base [2].
 - 2.5.1. FILE: MP4_A rat model of torsion of the testis 03:01 – 03:08
 - 2.5.2. FILE: MP4_A rat model of torsion of the testis 03:09 – 03:15
- 2.6. Next, grasp the lower pole of the testis in torsion/detorsion animals [1], twist it 720 degrees clockwise, and record the time to mark ischemia onset [2].
 - 2.6.1. FILE: MP4_A rat model of torsion of the testis 03:16 – 03:20

- 2.6.2. FILE: MP4_A rat model of torsion of the testis 03:26 – 03:39
- 2.7. To anchor the ischemic testis, create a scrotal pouch by holding the twisted testis of the torsion/detorsion group in place [1] and inserting long dissecting scissors downward along the tissue plane under the tunica vaginalis into the scrotum [2].
 - 2.7.1. FILE: MP4_A rat model of torsion of the testis 03:40 – 03:45
 - 2.7.2. FILE: MP4_A rat model of torsion of the testis 03:46 – 04:03
- 2.8. Keeping the scissors in place, insert an anchoring stitch with chromic 2-0 (*Two-oh*) suture from the lowest point of the scrotal pouch [1] into the connective tissue on the lower pole of the testis [2], then bring it back down into the pouch and outside it next to the initial point of entry [3].
 - 2.8.1. FILE: MP4_A rat model of torsion of the testis 04:05 – 04:29
 - 2.8.2. FILE: MP4_A rat model of torsion of the testis 05:25 – 05:34
 - 2.8.3. FILE: MP4_A rat model of torsion of the testis 06:01 – 06:38
- 2.9. Pull the torsed testis into the scrotum and gently exert downward traction on the two ends of the suture [1]. Then tie them firmly on the scrotal skin to anchor the testis [2].
 - 2.9.1. FILE: MP4_A rat model of torsion of the testis 06:38 – 07:02
 - 2.9.2. FILE: MP4_A rat model of torsion of the testis 07:03 – 07:10
- 2.10. Close the scrotal incision in both the sham-operated and torsion/detorsion groups using a continuous purse-string suture with chromic 2-0 [1].
 - 2.10.1. FILE: MP4_A rat model of torsion of the testis 07:42 –08:01, 08:50-08:55

Results

3. Results

- 3.1. Xanthine oxidase enzyme activity and Malondialdehyde concentration were significantly higher in the torsion/detorsion group compared with the sham-operated group [1]. Superoxide dismutase and Catalase activity in testicular tissues were significantly reduced in the torsion/detorsion group compared to the sham-operated group [2].
 - 3.1.1. LAB MEDIA: Figure 1A and 1 B. *Video editor: Please highlight the red bar labelled "T/D" in both graphs*
 - 3.1.2. LAB MEDIA: Figure 1C and 1 D. *Video editor: Please highlight the red bar labelled "T/D" in both graphs*
- 3.2. Glutathione peroxidase activity was also significantly reduced in the torsion/detorsion group compared with the sham-operated group [1].
 - 3.2.1. LAB MEDIA: Figure 1E. *Video editor: Please highlight the red bar labelled "T/D"*
- 3.3. Further, Tumor necrosis factor alpha concentration and Myeloperoxidase activity were significantly elevated in testicular tissues of the torsion/detorsion group compared with the sham-operated group [1].
 - 3.3.1. LAB MEDIA: Figure 2A and 2 B. *Video editor: Please highlight the red bar labelled "T/D" in both graphs*
- 3.4. Torsion/detorsion distorted testicular histoarchitecture, including degeneration of seminiferous tubules, germ cell loss, and interstitial fibrosis [1], while the sham-operated group maintained normal histological features [2].
 - 3.4.1. LAB MEDIA: Figure 3C and 3D. *Video editor: Highlight areas in both images pointed at by the arrows*
 - 3.4.2. LAB MEDIA: Figure 3A and 3B. *Video editor: Highlight areas in both images pointed at by the arrows*
- 3.5. Expression of caspase 3 was markedly increased in testicular tissues of the torsion/detorsion group, indicating enhanced apoptotic activity [1].
 - 3.5.1. LAB MEDIA: Figure 4. *Video editor: Please highlight the right panel labelled "T/D"*

1. Anesthetized
Pronunciation link: <https://www.merriam-webster.com/dictionary/anesthetize>
IPA: /əˈnes.θəˌtaɪzd/
Phonetic Spelling: uh·nes·thuh·tyzed
2. Scrotum
Pronunciation link: <https://www.merriam-webster.com/dictionary/scrotum>
IPA: /ˈskroʊ.təm/
Phonetic Spelling: ʊzroh·tuhm
3. Tunica
Pronunciation link: <https://www.merriam-webster.com/dictionary/tunica>
IPA: /ˈtuː.nɪ.kə/
Phonetic Spelling: too·nih·kuh
4. Vaginalis
Pronunciation link: <https://www.howtopronounce.com/vaginalis>
IPA: /ˌvædʒ.ɪˈneɪ.lɪs/
Phonetic Spelling: vaj·ih·nay·liss
5. Epididymis
Pronunciation link: <https://www.merriam-webster.com/dictionary/epididymis>
IPA: /ˌep.əˈdɪd.ə.mɪs/
Phonetic Spelling: ep·uh·did·uh·miss
6. Dissecting
Pronunciation link: <https://www.merriam-webster.com/dictionary/dissect>
IPA: /dɪsˈsekt/
Phonetic Spelling: dye·sekt
7. Proximally
Pronunciation link: <https://www.merriam-webster.com/dictionary/proximal>
IPA: /ˈprɑːk.sə.məl/
Phonetic Spelling: prok·suh·muhl
8. Exteriorize
Pronunciation link: <https://www.merriam-webster.com/dictionary/exteriorize>
IPA: /ɪkˈstɪr.i.əˌraɪz/
Phonetic Spelling: ek·steer·ee·uh·ryze
9. Mobilize
Pronunciation link: <https://www.merriam-webster.com/dictionary/mobilize>
IPA: /ˈmoʊ.bəˌlaɪz/
Phonetic Spelling: moh·buh·lyze
10. Gubernaculum
Pronunciation link: <https://www.howtopronounce.com/gubernaculum>
IPA: /ˌguː.bəˈnæk.jə.ləm/
Phonetic Spelling: goo·bur·nak·yuh·luhm
11. Detorsion
Pronunciation link: <https://www.howtopronounce.com/detorsion>

IPA: /di:'tɔ:r.ʒən/

Phonetic Spelling: dee·tor·zhuhn

12. Ischemia

Pronunciation link: <https://www.merriam-webster.com/dictionary/ischemia>

IPA: /ɪ'ski:.mi.ə/

Phonetic Spelling: iss·kee·mee·uh

13. Ischemic

Pronunciation link: <https://www.merriam-webster.com/dictionary/ischemic>

IPA: /ɪ'ski:.mɪk/

Phonetic Spelling: iss·kee·mɪk

14. Chronic

Pronunciation link: <https://www.merriam-webster.com/dictionary/chronic>

IPA: /'krɒs.mɪk/

Phonetic Spelling: kroh·mɪk

15. Suture

Pronunciation link: <https://www.merriam-webster.com/dictionary/suture>

IPA: /'su:.tʃə/

Phonetic Spelling: soo·cher

16. Traction

Pronunciation link: <https://www.merriam-webster.com/dictionary/traction>

IPA: /'træk.fən/

Phonetic Spelling: trak·shuhn

17. Xanthine

Pronunciation link: <https://www.merriam-webster.com/dictionary/xanthine>

IPA: /'zæn.θi:n/

Phonetic Spelling: zan·theen

18. Oxidase

Pronunciation link: <https://www.merriam-webster.com/dictionary/oxidase>

IPA: /'ɑ:k.sɪ.deɪs/

Phonetic Spelling: অক·sih·days

19. Malondialdehyde

Pronunciation link: <https://www.howtopronounce.com/malondialdehyde>

IPA: /mə'lɑ:n.dai'æl.dɪ.haɪd/

Phonetic Spelling: muh·lon·dye·al·duh·hyde

20. Superoxide

Pronunciation link: <https://www.merriam-webster.com/dictionary/superoxide>

IPA: /,su:.'pə'ɑ:k.said/

Phonetic Spelling: soo·per·ok·side

21. Dismutase

Pronunciation link: <https://www.merriam-webster.com/dictionary/dismutase>

IPA: /dɪs'mju:.teɪs/

Phonetic Spelling: dis·myoo·tays

22. Catalase
Pronunciation link: <https://www.merriam-webster.com/dictionary/catalase>
IPA: /'kæt.ə.leɪs/
Phonetic Spelling: kat·uh·lays
23. Glutathione
Pronunciation link: <https://www.merriam-webster.com/dictionary/glutathione>
IPA: /,gluː.tə'θaɪ.əʊn/
Phonetic Spelling: gloo·tuh·thy·ohn
24. Peroxidase
Pronunciation link: <https://www.merriam-webster.com/dictionary/peroxidase>
IPA: /pə'rɑːk.sɪ.deɪs/
Phonetic Spelling: puh·rok·sih·days
25. Myeloperoxidase
Pronunciation link: <https://www.howtopronounce.com/myeloperoxidase>
IPA: /,maɪ.ə.loʊ.pə'rɑːk.sɪ.deɪs/
Phonetic Spelling: my·uh·loh·puh·rok·sih·days
26. Histopathology
Pronunciation link: <https://www.merriam-webster.com/dictionary/histopathology>
IPA: /,hɪs.təʊ.pə'θɑː.lə.dʒi/
Phonetic Spelling: his·toh·puh·thal·uh·jee
27. Histoarchitecture
Pronunciation link: <https://www.howtopronounce.com/histoarchitecture>
IPA: /,hɪs.təʊ'ɑːr.kɪ.tek.tʃə/
Phonetic Spelling: his·toh·ar·kih·tek·cher
28. Seminiferous
Pronunciation link: <https://www.merriam-webster.com/dictionary/seminiferous>
IPA: /,sem.ə'nɪf.ə.əs/
Phonetic Spelling: sem·uh·nif·er·uhs
29. Interstitial
Pronunciation link: <https://www.merriam-webster.com/dictionary/interstitial>
IPA: /,ɪn.tə'stɪʃ.əl/
Phonetic Spelling: in·ter·stish·uhl
30. Fibrosis
Pronunciation link: <https://www.merriam-webster.com/dictionary/fibrosis>
IPA: /faɪ'brʊʊ.sɪs/
Phonetic Spelling: fy·broh·suhs
31. Histological
Pronunciation link: <https://www.merriam-webster.com/dictionary/histological>
IPA: /,hɪs.tə'lɑː.dʒɪ.kəl/
Phonetic Spelling: his·tuh·loj·ih·kuhl
32. Caspase
Pronunciation link: <https://www.howtopronounce.com/caspase>

IPA: /'kæs.pers/

Phonetic Spelling: kas·pays

33. Apoptotic

Pronunciation link: <https://www.merriam-webster.com/dictionary/apoptotic>

IPA: /,eɪ.pə:'tɑ:.tɪk/

Phonetic Spelling: ay·pop·tot·ik