About OMICS Group

OMICS Group is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access', OMICS Group publishes 500 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 500 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS International Conferences

OMICS International is a pioneer and leading science event organizer, which publishes around 500 open access journals and conducts over 500 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

MORPHOLOGY OF THE GRASSCUTTER OVARIES: A TOOL FOR A BETTER HEART FUNCTION

Onoja, Benedict Onu

Department of Veterinary Anatomy, University of Nigeria, Nsukka

Nigeria

5th International Conference on Clinical & Experimental Cardiology, April 29, 2015, Philadelphia, USA

GRASSCUTTER TAXONOMY

Kingdom-------Animalia
Phylum---------Chordata
Class-----------Mammalia
Order-----------Rodentia
Sub-Order-----Hystricomorpha
Family----------Thryonomidae
Genus----------Thryonomys
Species---------swinderianus
Thryonomys swinderianus (Temminck, 1827)

(Courtesy: http://www.eol.org/pages/326380)

INTRODUCTION

- Wild herbivorous rodent
  (Hystricomorph)

- Only in Africa (Baptist & Mensah,1986)

- French-speaking African countries –
  "agouti" (animal from the bush)-Adu *et al*.
  (1999)

INTRODUCTION CONT'

- Idomas – "obije"
- Tivs – "viha"
- Igbos – "nchii"

- Hausas – "jawji" or "jebji"
- Yorubas – " ewuju" or "oya"
- Igalas – "emi"

- Southern Africans – "Greater Cane Rat" or "Cane Rat" (Mensah & Okeyo, 2005)
- Nigeria – "grasscutter"(Ismail, 2008)

INTRODUCTION CONT'

- Have short legs (Adu, 2005)
- Short tails with body covered with coarse, bristly and even spiny hairs like porcupine (Mensah & Okeyo, 2005)
- Breeds all-year-round with peak incidence of pregnancy between June and *July-months of* greatest rainfall (Addo *et al*., 2007)
- Narrow heads tapering rostrally (Ismail, 2008)

STATEMENT OF PROBLEM

- Dependence on wild stock as source of grasscutter meat, has led to indiscriminate bush-burning, porching, destruction of forest reserves, environmental pollution & destruction of the ecosystem by depletion of the ozone layer.

STATEMENT OF PROBLEM CONT'

- There are documented scientific reports on the:
- nervous system (Byanet *et al.*, 2008)
- gastrointestinal tract (Byanet *et al.*, 2008; Nwaogu and Adibe, 2010)
- skeletal system (Byanet and Nwaogu, 2010)
- respiratory system (Ajayi *et al.*, 2009; Nwaogu and Aghaebita, 2010).

STATEMENT OF PROBLEM CONT'

- Paucity of scientific information on the reproductive system of the doe, which could have facilitated its maintenance in captivity and help breeders expand their small scale to large scale necessitated this research.

JUSTIFICATION

- Pilot farms by the Benin-German Government yielded favourable results in 1985 at Songhai Centre (Jori *et al*., 1995)

- Source of protein and very low cholesterol (NRC,1991)

- Pets: Derivation of pleasure by the owners

JUSTIFICATION CONT'

- Domestication: Grasscutter could be tamed & used as laboratory animal (Addo, 1998)

- Income: Grasscutters in captivity help breeders expand from small scale to large scale business (Adu & Yeboah, 2002)

- Bomb Sniffing Research is On-going

RESEARCH QUESTIONS

- What structural changes occur in the ovaries of the female grasscutter as she attains puberty?
- Are the ovaries morphometrically determined pre-natally?
- At what age do female grasscutters attain puberty?
- Will the consumption of the grasscutter meat better the heart function?

OBJECTIVES

MAIN OBJECTIVE:

- To Evaluate Changes in the ovaries of the Grasscutter.

SPECIFIC OBJECTIVES:

- To evaluate the morphometry of the ovaries

- To evaluate the histomorphology of the ovaries.

MATERIALS & METHODS

- Fifteen female grasscutters were purchased from David Mark Farms in Otukpo, Benue State.
- Adminstration of multivitamin preparation were done prior to conveying the grasscutters (Adenkola *et al*., 2009)
- Metallic cages as described by Raymond (2000) were used to convey the grasscutters to the experimental site
- The grasscutters were divided into 3 groups of 5 each: Group A (1-3mths), Group B (4-6 mths) and Group C (7-9mths) respectively

MATERIALS & METHODS CONT'

GROSS:

- Sedation-10mls of chloroform was applied unto a towel and put in a container.
- Each grasscutter was anesthesized for 5 mins.
- Live weight- A weighing scale with sensitivity of 20kg was used to weigh the grasscutters.
- The grasscutters were ovarectomized.

MATERIALS & METHODS CONT'

- Photography-Samsung digital camera (7.2 Megapixels) was used to capture images in-situ.
- Weighing of the ovaries using Mettler Balance with sensitivity of 0.00001g.
- Morphometry: Measurements of the ovaries vernier calipers, thread and meter rule were done.
- Standardized animal protocals were observed throughout the research.

MATERIALS & METHODS CONT'

LIGHT MICROSCOPY:

- Fixation- The ovaries were cut into blocks of 0.5cm in diameter & fixed by immersion in 10 % Neutral Buffered Formalin & 10 % Bouin's fluid (300 mls of saturated aqueous solution of picric acid, 100 mls of formalin and 20 mls of glacial acetic acid as described by Drury *et al*., (1976) in a ratio of 1: 1 for 24hrs

- Dehydration- The ovaries were passed through series of ascending ethanolic concentration of 70%, 80%, 90%, 95% and 100%

- Clearing-The ovaries were passed through series of ascending concentrations of xylene (70%, 80%, 90%, 95% and 100%)

MATERIALS & METHODS CONT'

- Embedding- The ovaries were embedded in molten paraffin wax (Junqueira, 2010)

- Sectioning-Jung rotary microtome was used to section the embedded tissue to 6µm and placed in a floating-out bath maintained at 50ºC & mounted on a grease-free albumin-coated glass slide

- Clearing- The tissues were dewaxed in series of descending concentrations of xylene (100%, 95%, 90%, 80%,70%)

MATERIALS & METHODS CONT'

- Staining-The tissues were stained with Haematoxylin and counter-stained with Eosin and placed on a hot plate to dry

- Microscopic Examination- The dried slides were examined with Olympus microscope and appropriate slides selected

- Photomicroscopy-digital moticam MC 2001 1.3 Megapixels USB 3.0 was attached to a microscope and images captured unto a laptop

DATA ANALYSIS

- Statistical Package for Social Sciences (SPSS) version 15 was used for data analysis.

- The data were analyzed using one-way ANOVA & Variant Means were separated using Duncan's Multiple Range Test.

DATA ANALYSIS CONT'

- Weights (g) & Lengths(cm) were expressed as Means ± Standard Errors of the Means.

- Significance was accepted at $p < 0.05$.



FEMALE GRASSCUTTER



METALLIC GRASSCUTTER CAGE



GRASSCUTTER RESTRAINT



GRASSCUTTER FORAGE



GRASSCUTTER CONCENTRATE

RESULTS
&
DISCUSSION

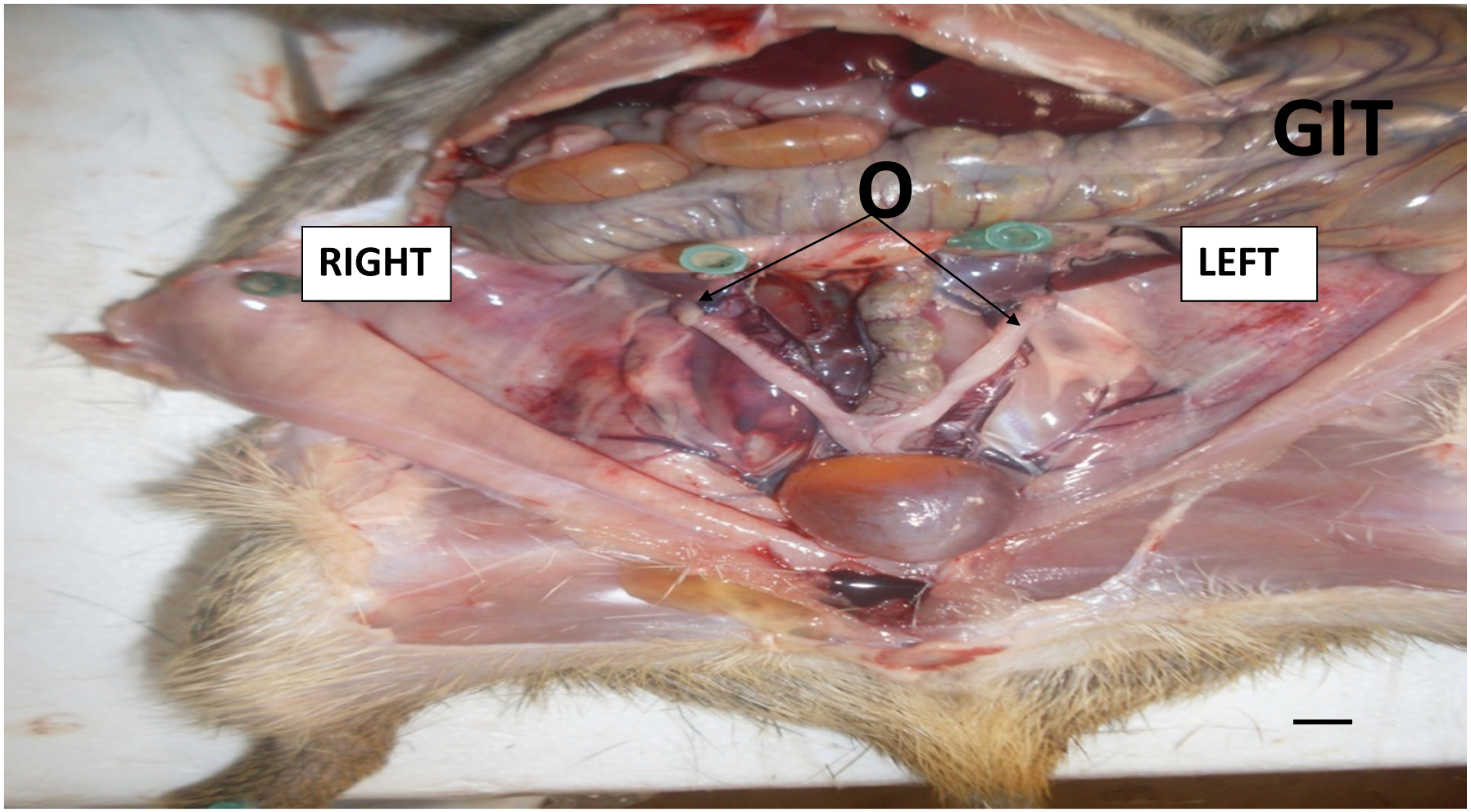


Plate 1: Abdominal Cavity of the Grasscutter at 1-3 Months showing the Ovaries (O), *in-situ*; Note that the Gastrointestinal Tract (GIT) was laterally displaced to expose the Ovaries.
Scale Bar =1cm.

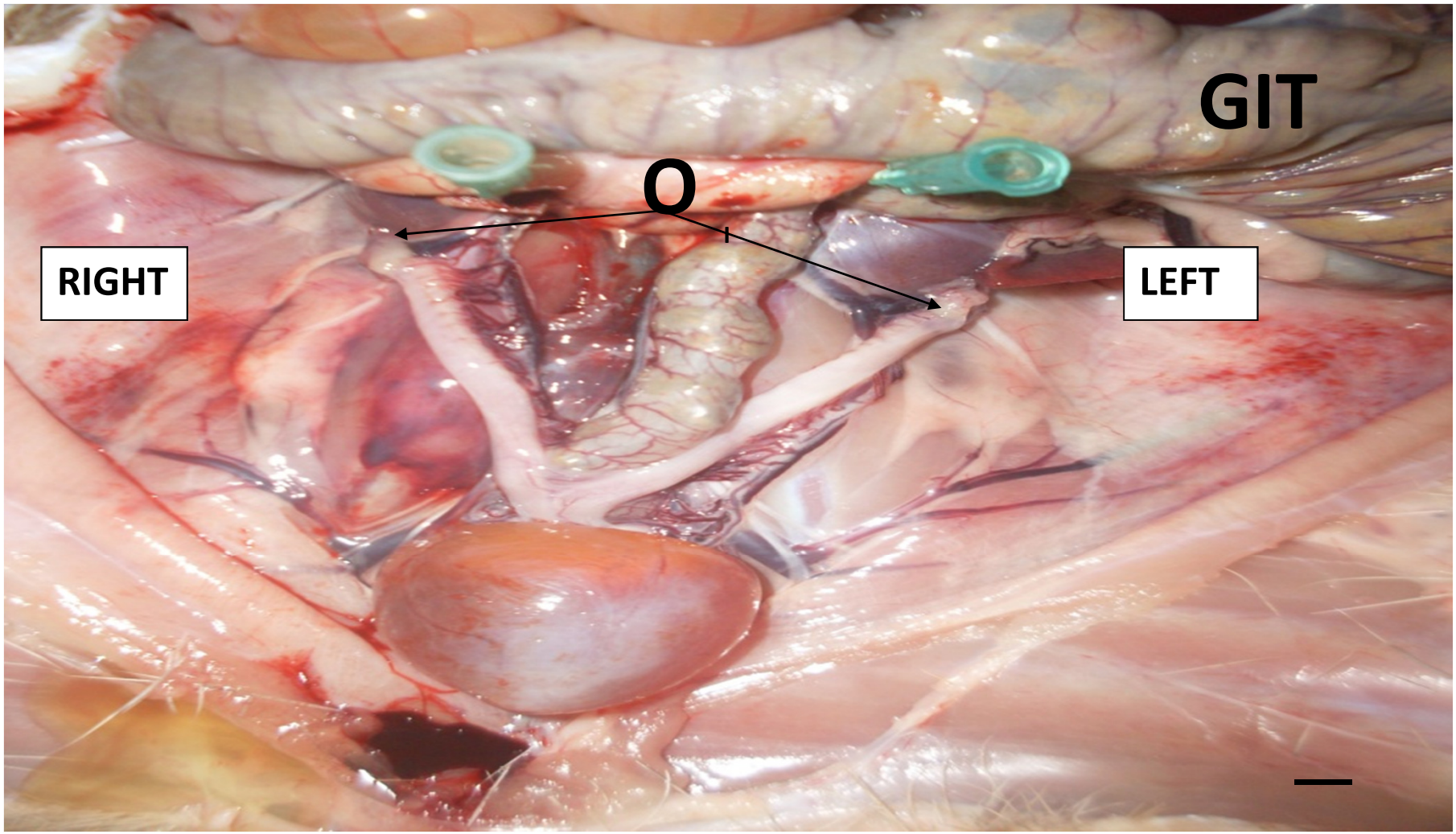


Plate 2: Abdominal Cavity of the Grasscutter at 4-6 Months showing the Ovaries (O), *in-situ*; Note that the Gastrointestinal Tract (GIT) was laterally displaced to expose the Ovaries. Scale Bar =1cm.



Plate 3: Abdominal Cavity of the Grasscutter at 7-9 Months showing the Ovaries (O), *in-situ*; Note also that the Gastrointestinal Tract (GIT) was laterally displaced to expose the Ovaries. Scale Bar =1cm.

TABLE 1: MEAN PERCENTAGE ORGANO-SOMATIC INDICES (MPOSI) ± SEM OF THE LEFT AND RIGHT OVARIES OF THE GRASSCUTTERS

SEGMENTS	AGES (MONTHS)		
	1-3	4-6	7-9
Left Ovary	1.74 ± 0.04^{a}	2.02 ± 0.05^{b}	2.38 ± 0.08^{c}
Right Ovary	1.45 ± 0.01^{a}	1.79 ± 0.07^{a}	2.13 ± 0.03^{b}

Different Superscripts ^{abc} in a Row Indicate Significant Difference at $\mathbf{p < 0.05}$.

TABLE 2: MEAN RELATIVE LENGTHS (MRL) ± SEM OF THE LEFT AND RIGHT OVARIES OF THE GRASSCUTTER AND THEIR CROWN-RUMP LENGTHS

SEGMENTS	AGES (MONTHS)		
	1-3	4-6	7-9
Left Ovary	0.51 ± 0.08^{a}	1.09 ± 0.11^{b}	1.83 ± 0.14^{c}
Right Ovary	0.25 ± 0.06^{a}	0.81 ± 0.10^{b}	1.35 ± 0.07^{c}

Different Superscripts ^{abc} in a Row Indicate Significant Difference at **$p < 0.05$.**

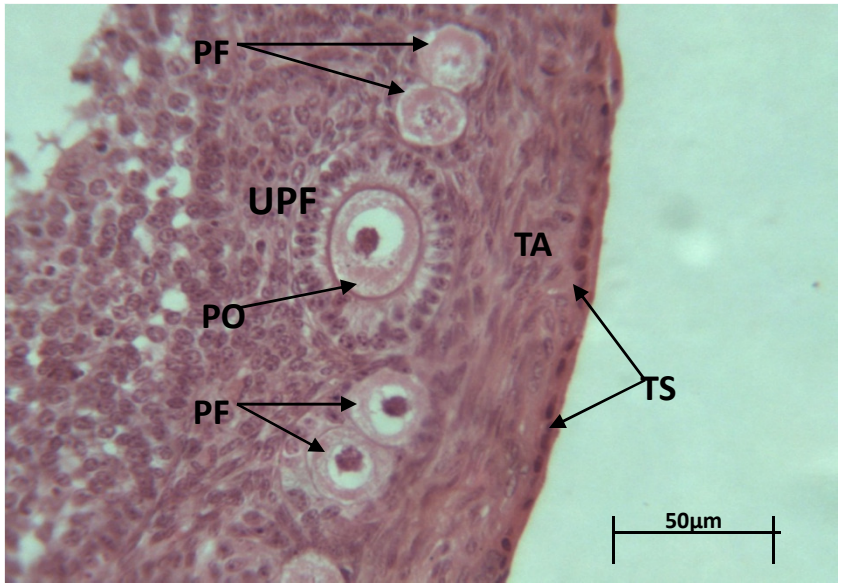


Plate 7: Transverse Section of the Ovarian Cortex at 1-3 Months showing the Tunica Serosa (TS), Tunica Albuginea (TA), Pairs of Primordial Follicle (PF), Unilaminar Primary Follicle (UPF) and Primary Oocyte (PO). x400. H & E.

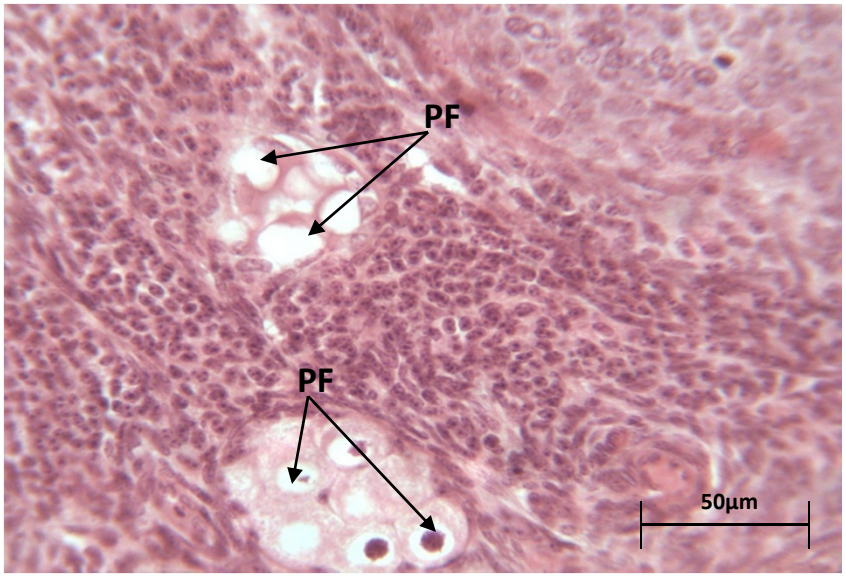


Plate 8: Section of the Ovarian Cortex at 1-3 Months showing a "Nest" of Primordial Follicles (PF). x400. H & E.

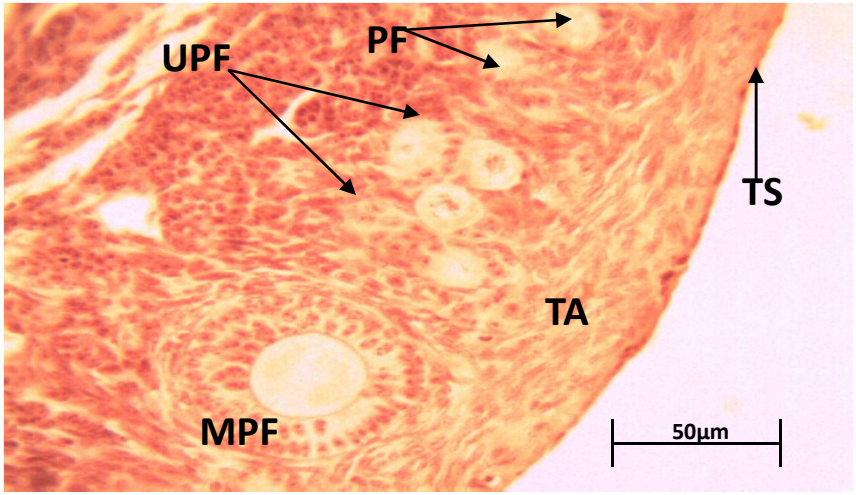


Plate 9: Transverse Section of the Ovarian Cortex at 4-6 Months showing the Ovarian Follicles at Different Stages of Development; Tunica Serosa (TS), Tunica Albuginea (TA), Primordial Follicle (PF), Unilaminar Primary Follicle (UPF) and Multilaminar Primary Follicle (MPF). x100. H & E.

CR

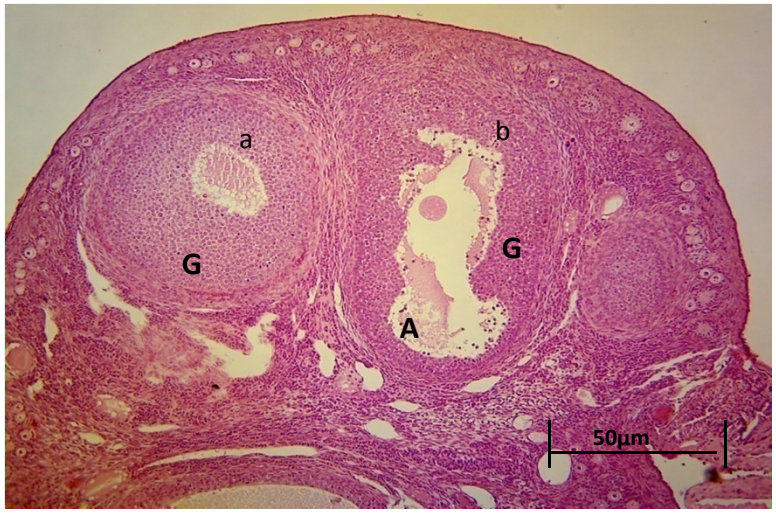


Plate 10: Section of the Ovarian Cortex at 7-9 Months showing two Secondary Follicles; (a) Granulosa Cells (G) surrounding the Oocyte without Antrum. (b) Granulosa Cells (G) with an Antrum (A). x100. H & E.

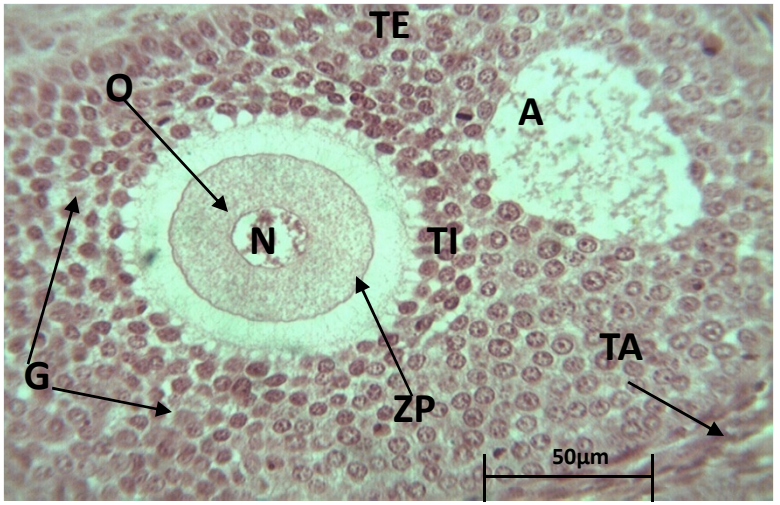


Plate 11: Transverse Section of the Ovarian Cortex at 7-9 Months showing a Secondary Follicle: Antrum (A), Centrally located Oocyte (O), Nucleus (N) of the Oocyte, Zona Pellucida (ZP), Multi-layered Granulosa Cells (G), and Tunica Albuginea (TA). Note the Theca Interna (TI) and Theca Externa (TE). x400. H & E.

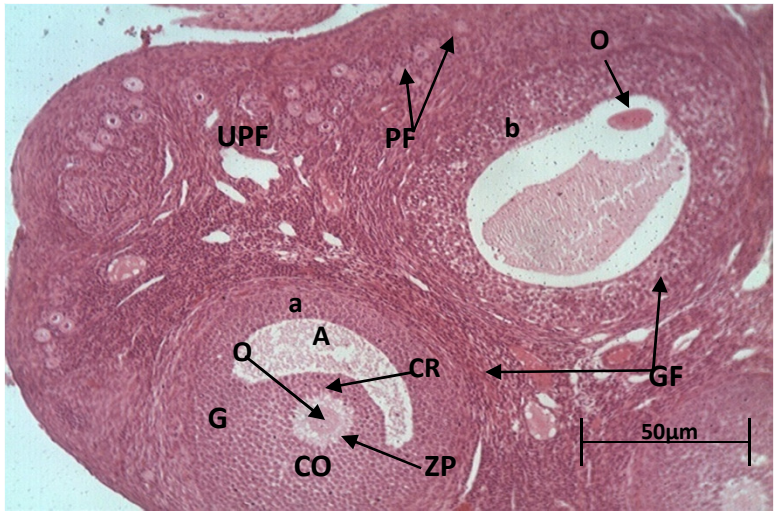


Plate 12: Ovarian Cortex at 7-9 Months showing Different Stages of Follicular Development; Primordial Follicle (PF), Unilaminar Primary Follicle (UPF) and Graafian Follicle (GF); (a) Antrum (A), Corona Radiata (CR), Cumulus Oophorus (CO), Zona Pellucida (ZP), Granulosa Cells (G), Oocyte (O) at the centre of the ovary. (b) Oocyte (O) at the periphery of the ovary. x100. H & E.



Plate 13: Section of the Ovarian Cortex at 7-9 Months showing the Corpus Haemorrhagicum (CH) indicated by blood clot (Arrow) within the inner wall of the Graafian Follicle. Note the Indentation (I) on the Ovarian wall. x400. H & E.

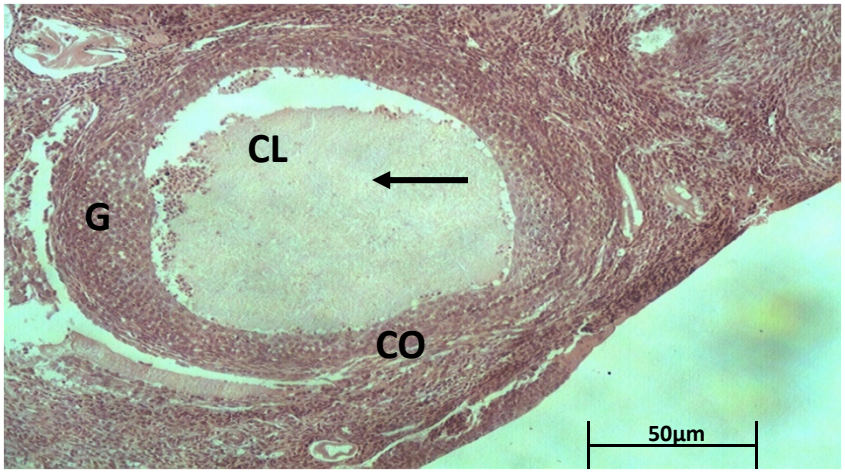


Plate 14: Transverse Section of the Ovarian Cortex at 7-9 Months showing the Corpus Luteum (CL), Remnants of Granulosa Cells (G), Remnants of Cumulus Oophorus (CO) and Liquor Folliculi (Arrow). x100. H & E.

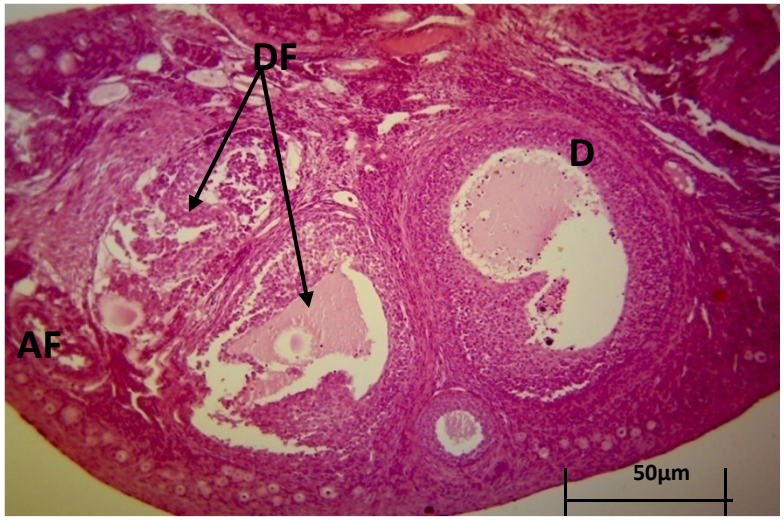


Plate 15: Section of the Ovarian Cortex at 7-9 Months showing Developing Follicles (D), Degenerating Follicle (DF) and Atretic Follicle (AF). x100. H & E.

SUMMARY

GROSS

- The ovaries were spindle-shaped at 1-3 moths of age.
- The ovaries were oval at 4-6 months of age.
- The ovaries were round at 7-9 months of age.

SUMMARY CONT'

MORPHOMETRY

- The MPOSI & MRL of the Ovaries Increased Significantly as the Animal Attained Puberty.
- The Left Side was Significantly Higher than the Right in All the Age Groups.
- The Weights & Lengths of the Ovaries were not Determined Pre-Natally.

SUMMARY CONT'

HISTOMORPHOLOGY

- Centrally Located Oocyte in the Ovarian Follicle Both at 1-3 & 4-6 Months of Age.
- Peripherally located Ooctye in the Ovarian Follicle at 7-9 Months of Age.
- Corpora Haemorrhagica & Lutea that were absent @ 1-3 & 4-6 Months of Age in the Ovarian Follicle, were Present @ 7-9 Months of Age.

CONCLUSION

- Puberty in the Female Grasscutters was Attained @ 7 Months of Age.

- Breeders & Reseachers can Avail themselves of this Information; so as to know when to Breed their Female Grasscutters.

CONCLUTION CONT'

- Grasscutter meat, being white, has very high protein content but low cholesterol level (NRC,1991). Thus, consumption could reduce cardiovascular disorders like arteriosclerosis, high blood pressure, congestive heart failure, stroke and even death.

CONTRIBUTION TO KNOWLEDGE

- This is the First Time a Concise Study of the Gross, Morphometry & Histomorphology of the Ovaries of the Grasscutter @ the Light Microscopic Level would be Carried Out.

RECOMMENDATION

- More Research on the Female Reproductive System of the Grasscutter Using Electron Microscopic Technique is Advocated so as to Elucidate Minute Details.





CARE FOR ONE?

THANK YOU !!!

Thanks' for your kind attention!!!!!!



Let Us Meet Again

We welcome you all to our future conferences of OMICS International

Please Visit:

http://cardiology.conferenceseries.com

http://www.conferenceseries.com/

http://www.conferenceseries.com/clinical-research-conferences.php