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Some morphometric changes associated with sickle cell disease in children/adolescents in the Niger Delta region of Nigeria. A.O. [1]EJELE, A.L. [2]ASOMUGHA & H.B. [3]FAWEHINMI. *[1]Department of Hematology, Immunology & Blood Transfusion University of Port Harcourt Teaching Hospital, [2]Department of Anatomy Nnamdi Azikiwe University Nnewi, [3]Department of Anatomy University of Port Harcourt.*

Some of the long-term complications of sickle cell disease are growth retardation and morphological changes, which affect prediction anthropometry. This study on the morphometric changes (Head, chest and thigh circumference) was carried out on 40 patients confirmed homozygous for the disease who attended the sickle cell clinic at the University of Port Harcourt Teaching Hospital, and 160 normal growing children/adolescents drawn from the University of Port Harcourt Daycare, Nursery and Demonstration Primary and Secondary Schools, all aged between 2 - 18 years. The techniques of measurement followed those described by Tanner et al, and using internationally accepted methods in anthropometry. The data obtained were then analyzed statistically and separately for the different ages and their mean values obtained with standard error of mean plotted and compared on superimposed graphs. The result shows that values for head circumference in sicklers were generally higher than those for normal growing children/adolescents. This was attributed to the bossing of the skull associated with this disease. Values for chest circumference showed variation with age due to physiological and pathological changes with the disease. Measurement of thigh circumference showed values which are generally lower for sicklers in this study.

Venous drainage of the bovine heart: a preliminary study. T.K. [1]ADENOWO, O.S. [1]ADEWOLE, M. [1]FAJEMILEHIN, M. [2]EBUNOLUWA, & O. [3]ADEOLA. *[1]Department of Anatomy & Cell Biology, College of Health Sciences; [2]Department of Zoology; [3]Department of Pediatrics, Obafemi Awolowo University, Ile-Ife, Nigeria.*

Following a study of the blood drainage system of the hearts of some mature and healthy cattle procured from Ede-road abattoir in Ile-Ife, the coronary sinus was observed as the principal vein of bovine heart. This chamber was located at the posterior aspect of the coronary sulcus and drained directly into the right atrium. The following veins were observed to drain directly into the coronary sinus:

1. The great cardiac vein,
2. Anterior vein of the left ventricle,
3. The left marginal ventricular vein,
4. The middle cardiac vein,
5. The posterior vein of the right ventricle and
6. The posterior veins of the right ventricle (the small cardiac veins)

It was obvious from this study that the pattern of the coronary venous drainage in the bovine was extremely variable. The great cardiac vein originated from the posterior part of the apical region of the heart (75%); the great cardiac vein anastomosed with the middle cardiac vein at the posterior part of the right ventricle (25%). The posterior vein of the left ventricle anastomosed with the great cardiac vein at the posterior part of apex of the heart (25%) and the left marginal vein originated at the anterior part of the left ventricle (75%). The left ventricle appeared to have more vascular net-work than the right due to its greater involvement in the systemic circulation; as rapid and effective removal system is needed for the large amount of toxic metabolic end products of its activities. The rich venous drainage observed in the bovine heart sub-serves the removal of toxic metabolites during the enormous contractility of the myocardium at the left ventricle. Based on the relatively large size of the bovine heart and its vessels, it may be very handy as a model for the study of mammalian hearts.

Development of transverse tubular system (T-Tubules) in the hamster (*Mesocricetus auratus*) myocardium. S.K. ADJENTI, A.S. AYETTEY, C.N.B. TAGOE, E.E. DENNIS, *Department of Anatomy, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra, Ghana.*

The development of T-system was studied in pre- and post-natal hamsters with the aid of the electron microscope. Thin sections (70 – 90 nm) and semi-thin sections (800 – 1000 nm) were cut using a LEICA ULTRA CUT R ultramicrotome with a diatome knife and examined under a JEOL JEMI 1010 electron microscope. No evidence of T-tubules was observed in pre-natal and first week in neonatal stages of development when myocytes were characterised by large cytoplasmic spaces with few and partially developed but functioning myofibrils. Between days 7 and 14 of post-natal life, myofibrils developed rapidly. The A- and I - bands became more distinct. At day 7, shallow indentations of the sarcolemma at the Z-line regions appeared, representing the early beginnings of the T-system. Wide T-tubule invaginations of sarcolemma with cross-sectional diameter of 200 to 205 nm began to appear in right and left ventricle myocytes at day 21 of post-natal life in some Z-line regions of myofibrils. At this stage also, myofibrils had adopted adult form, with well-organized cross-striations. Mitochondria were also well developed,

occupying the spaces between rows of myofibrils. This study supports the view that T-tubules are primarily adapted for homeostatic functions of the mammalian cardiac myocytes, improving efficiency of transport of metabolic substrates and products, and not for excitation-contraction coupling as presumed by some workers. It also shows that the wide T-system observed in the studies of myocytes of adult hamster is pre-determined as this feature is noticeable as early as the third week of post-natal development, coinciding with maturation of the myofibrils for active adult life.

Dimensions and position of the uterus in southern Nigerians. P.S. IGBIGBI[1], B.C. DIDIA[1]& N.C. NWANKWO[2]. *[1]Departments of Anatomy &[2]Radiology, College of Health Sciences, University of Port-Harcourt, Nigeria.*

The dimensions and position of the uterus were determined in one hundred healthy Nigerian volunteers using a trans-abdominal sonography method. The measurements obtained were correlated with the anthropometric parameters of age, weight and height. The mean uterine dimensions of the studied subjects were length 7.30 cm (SD 1.30), width 4.76 cm (SD 0.70) while the thickness was 3.57 cm (SD 0.60). There were linear relationships between these dimensions and the anthropometric parameters except between the length of the uterus and the height of the women ($r = 0.099$). The most common uterine position was anteversion 89%, followed by 10% retroversion and then 1% axial. With the exception of thickness, these values were comparable with those of Caucasians often quoted in standard Anatomy textbooks but were, on the lower limits of the Caucasian values. Furthermore, our studied population had thicker mean uterus than their Caucasian counterparts. This study documents the normal uterine dimensions and position of a Negroid population probably for the first time, showing the highest anteverted uterine position and there appears to be racial differences in this position when compared with those of previous authors. The study is useful in comparative anatomy and also of clinical importance to practicing surgeons in our part of the world.

A study of the footprint ratio in indigenous Kenyans and Tanzanians. P.S. IGBIGBI, B.C. MSAMATI & M. SHARRIF. *Department of Anatomy, College of Medicine, University of Malawi, Malawi.*

The footprint ratio or arch index is the ratio of the middle third of the toeless footprint to the toeless footprint area. We determined this index in able-bodied indigenous Kenyans and Tanzanians who did not have foot pain, by using their dynamic footprints to classify the foot arch types and the incidence of *pes planus* according to Cavanagh and Rogers (1987). Males had a significantly higher arch index than females in both populations ($P< 0.05$). The incidence of *pes planus* in Kenyans was 432/1000, the highest ever documented being twice as high as that for Tanzanians, 203/1000. Our study has shown the usefulness of the index in determining the incidence of *pes planus*, predicting foot pathology and may serve as an early warning sign of structural and functional defects of the foot in a given population.

***Eleutherodactylus coqui* as a model of heterochrony**. C.K. [1]Osabutey & M.K. [2]Richardson. *[1]Department of Anatomy, School of Medical Sciences, University of Science & Technology, Kumasi, Ghana. [2]St George's Hospital Medical School, Department of Anatomy, UK*

Evolutionary developmental biology is concerned with comparisons of developmental timing in species for appearance of organs at various embryonic stages. Some species show such divergent patterns of development that it is difficult to identify common stages. We studied the embryology of *Eleutherodactylus coqui*, a direct developing neotropical anuran with no tadpole stage. It hatches as a miniature froglet, and its life cycle therefore differs considerably from that of the widely studied indirect developer *Xenopus laevis*. The present study looked systematically for differences in organogenesis, particularly those, which might reflect heterochrony (an evolutionary change in developmental timing). However, a comparison between *E. coqui* and *X. laevis* poses problems because each of the standard stages for *E. coqui* covers a large timespan. Furthermore, they do not include details of internal organ development. This problem was overcome by comparing developmental sequences involving a histological study of organogenesis in *E. coqui* embryos from Townsend-Stewart stages 3 to 8. Graphically comparing data in the present study on the sequences of organogenesis in *E. coqui* with published data for *Xenopus* revealed that differences in the life cycle of these species are reflected in a different pattern of organogenesis. Of particular note are changes in timing of skin pigmentation, stomodeal opening, appearance of hepatic cords, and lens differentiation. Many of these differences can be correlated with the need for indirect developers to adopt a free-living larval phase at an early stage of development.

Wound healing in the hindbrain of the chick embryo. K. ADUTWUM-OFOSU, A.L. LAWSON, C.N.B. TAGOE, E.E. DENNIS. *Department of Anatomy, University of Ghana Medical School, Korle-Bu, Accra.*

The present study has a three-fold aim, namely, (1) To ascertain whether the hindbrain roof plate at the time it is undergoing apoptosis possesses the ability to close when it is reopened through wounding; (2) To determine the mechanisms by which roof plate closure is achieved in the event of it occurring despite apoptosis; and (3) To determine whether wound healing in the hindbrain roof plate affects its morphogenetic thinning. Chick embryos at stages 11 and 12 of development were wounded in the dorsal midline of hindbrain rhombomeres r1/r2 and r1-r3, and re-incubated for varying periods of time to allow healing

to be effected. At zero hour the wound was slit-like or gaped slightly, with the wound edges of the surface epithelium capping that of the neuroepithelium. Healing of both the surface epithelium and the neuroepithelium began from the ends of the wound within 30 minutes of re-incubation. Healing of both layers then progressed in a zipper-like manner towards the middle portion of the wound. The sequence of healing was surface epithelium first, followed by neuroepithelium. Complete healing occurred in both r1/r2 and r1-r3 wounds, implying that the length of the wound did not affect the ability of the hindbrain roof plate to repair itself. Additionally, the longer r1-r3 wounds healed at a faster rate than the shorter r1/r2 wounds such that at any given time, the average length of wound healed for the two groups (i.e. r1/r2 and r1-r3) did not differ significantly. Acridine orange histochemistry revealed that apoptosis in the hindbrain occurred normally in the presence of wound healing leading to the normal morphogenetic thinning of the hindbrain roof plate. The implication is that the early embryo has in place reparative mechanisms that ensure that assaults to it are taken care of, thereby preventing the interference of normal morphogenesis. Healing of the neuroepithelium in the presence of massive apoptosis suggests that apoptosis may not likely predispose the hindbrain to the development of NTDs.

The effects of dexamethasone, metronidazole, and ascorbic acid on the gamma-ray -induced morphological changes in the spinal cord of Wistar Rat. O. OWOEYE *University of Ibadan, Ibadan, Nigeria*

Irradiation is one of the modes of treatment of neoplasia. It has adverse effects, one of which is the occurrence of radiation myelopathy as a delayed complication of irradiation in humans. Similar lesions have been demonstrated in the spinal cord in animal experiments. Our aim was to study the effects of dexamethasone, metronidazole, and ascorbic acid on the morphological response of spinal cord to radiation and thereby determine if any of them may be useful agent in protecting the spinal cord from radiation injury. Fifty Wistar rats were used in 3 groups: control, irradiation only, and irradiation plus drugs. Drugs were administered parenterally, and 2.5 Gy units of gamma rays obtained from cobalt 60 through an AECL machine were used to irradiate the animals. The animals were sacrificed on day 14 post-irradiation, and the cervical segments of the spinal cord was dissected out and processed for histological examination. All animals that had gamma irradiation had microscopically demonstrable lesions involving neural tissues and blood vessels in the studied segments, with or without drugs. These included neuronal shrinkages in the anterior gray matter, degenerated neurons with depleted Nissl granules, loss of endothelial integrity, lose of arteriolar smooth muscle, and splitting of tunica media. There was a greater average diameter in the size of the neurons of the anterior horn of the control when compared with those treated with irradiation (with or without drugs), and this was statistically significant.

When the dead teach the living: Ethical issues involved. F.C. OSUAGWU *Department of Anatomy, University of Ibadan, Ibadan, Nigeria*.

The dissection of human cadavers has been controversial from ancient times. The taboo against desecrating the bodies of the dead goes back many centuries; both ancient Greek and Roman religious authorities prohibited dissection. Christian doctrine teaches the sanctity of human remains and promises the resurrection of the body, which many thought then and sometimes now to be impossible if a body were to be dismembered by dissection. Pioneer anatomists fought numerous battles to remove the myopic and prejudistic cocoon which religion and superstition wove around humans' reasoning in those early times. Thus, anatomists have the unique privilege to be permitted to utilize human remains and because of the sensitive nature of this there is a level of responsibility associated with it. Despite human's evolution to build more complex societies and ideologies; many cultures still ascribe many powers and taboos with the body of the dead especially in African societies such as ours. Therefore, most anatomy departments in this part of the world obtain their cadavers from criminals and unclaimed bodies released to them by the state, unlike in developed countries where people voluntarily bequeath their bodies to anatomy departments. The ethical issues involved are discussed. With the relentless debate over the years on the value of cadaver dissection in medical students' course in human anatomy, the best 3 -D computer simulators can never replace dissection because of its uniqueness in jolting our future physicians to have a thought on the issues of their mortality, death, dying and an intense psychological, moral, ethical, and spiritual awakening which only collaboration with the dead can elicit. Learning to deal with death is a skill that does not always accompany scientific training thus the more students can open themselves up to the humanistic side of anatomical learning, the more compassionate they will become.

A comparative study of the wound healing properties of Honey and *Ageratum conyzoides*. O.W. OLADEJO[1], I.O. OMOSEMI[1], F.C. OSUAGWU[1], O.O. OYEDELE[1], A.AIKU[2], O.O. OLUWADARA[1], O.E. EKPO[1], O.ADEWOYIN[3], E.E.U. AKANG[4]. *Department of Anatomy[1], Physiology[2], Pharmacognosy[3] and Pathology[4], College of Medicine, University of Ibadan, Ibadan, Nigeria.*

The present study investigates the wound healing properties of methanolic extracts of leaves of *Ageratum conyzoides* compared with those of honey. Thirty Wistar rats were randomized into 3 groups of 10 animals each. They were fed with standard rat cubes and tap water, weighed and acclimatized to laboratory

conditions for one week. Under anesthesia, each animal had the skin of its dorsolateral flank shaved after which an area of skin was excised. On achieving hemostasis, the wounds were packed with gauze soaked in the appropriate dressing for each group. Measurement of wound size, and wound biopsies were taken on the 10th day post wound creation. Together with healed wound samples, these were processed for histology. Fibroblast and blood vessel densities per unit area of wound were determined for the healed wound samples. Histologically, the day 10 Ageratum sections had fewer inflammatory cells compared with similar honey and control sections. Also, healed scar sections of wounds dressed with the herb extract showed more fibrosis. Honey and Ageratum caused significant greater wound contraction than controls. ($p=0.001$ and 0.005 respectively). Healed wounds from the Ageratum group had significantly fewer fibroblasts that honey and controls. ($p=0.012$ and 0.036 respectively).

Enhanced wound contraction in fresh wounds dressed with honey in Wistar Rats (*Rattus novergicus*). F.C. OSUAGWU[1], O.W. OLADEJO[4], I.O. IMOSEMI[1], A. AIKU[2], O.E. EKPO[5], A.A. SALAMI[1], O.O. OYEDELE[4], E.U. AKANG[3]. *Department of Anatomy[1], College of Medicine, University of Ibadan. Department of Physiology[2], College of Medicine, University of Ibadan. Department of Pathology[3], College of Medicine, University of Ibadan. School of Anatomical Sciences[4], University of the Witwatersrand, Johannesburg, South Africa. Department of Anatomy[5], Ladoke Akintola University of Technology, Ogbomoso, Nigeria.*

An investigation was carried out to ascertain reports that honey accelerates wound healing, by assessing its effects on wound contraction in fresh wounds inflicted on Wister rats. Twenty adult male Wister rats had 2 cm by 2 cm square wound inflicted on their right dorsolateral trunk. They were divided into two groups. The experimental group had their wounds dressed with honey while the control group had normal saline dressing. Wound dressing was done every five days and measurements taken at each dressing. Wound morphology was also assessed. Results revealed that dressing with honey significantly enhanced percentage wound contraction on day 10, with value of 79.2 (SD 2.94) compared to control value of 53.50 (SD 4.32. $p=0.0$). The mean wound measurement on day 10 reduced significantly in honey group, 1.15 (SD 0.18) compared to control group 2.38 (SD 0.28). ($p=0.002$). However, there was no significant difference in fibroblast count per high power field in honey group 68.0 (SD 2.59) compared to control 90.2 (SD 17.40, $p=0.242$). Honey dressing increased mean blood vessel count per high power field, 18.8 (SD 3.77) albeit non-significantly when compared to control value of 13.4 (SD 2.44. $p=0.264$). Also honey dressing caused increased granulation tissue formation in wounds dressed with honey compared to control group. Our study suggests that honey dressing enhances wound contraction in fresh wounds which is one of the key features of wound healing.

Wound healing activities of methanolic extracts *Ocimum gratissimum* leaf in Wistar Rats. F.C. OSUAGWU[1], O.W. OLADEJO[1], I.O. IMOSEMI[1], A. AIKU[2], O.E. EKPO[1], O.O. OLUWADARA[1], O.O. ADEWOYIN[5], P.C. OZEGBE[4], E.E.U. AKANG[3]. *Anatomy Department[1], College of Medicine, University of Ibadan. Physiology Department[2], College of Medicine, University of Ibadan. Pathology Department[3], College of Medicine, University of Ibadan. Department of Veterinary Anatomy[4], University of Ibadan. Department of Pharmacognosy[5], University of Ibadan.*

The wound healing effect of leaf extracts of *Ocimum gratissimum* was investigated in adult male Wister rats. Two groups of adult male Wister rats, average body weight 170 g, had a 2 cm by 2 cm square trunk with panniculus carnosus removed also. Experimental group had their wound dressed with leaf extracts of *Ocimum gratissimum* while control group had normal saline dressing. All animals had wound dressing done every five days; wound dimensions measured and, wound morphometry assessed. Wound biopsy was done by random selection in each group on day 10 and the day of complete re-epithelization. Routine paraffin wax processing was done, slides stained with hematoxylin and eosin for histological assessment of fibroblast count, neovascularization and granulation tissue profile. The results revealed significant wound contraction ($p<0.05$) on day 10 in the experimental group (mean 73.40, SD 3.30) compared with the control group (mean 53.50, SD 4.32). Histology of the healed scar showed non-significant ($p>0.05$) decreased in the mean fibroblast count for the experimental group (83.80, SD 5.70) relative to fibroblast count of 90.20 (SD 17.93) in the control group. The mean blood vessel count was also non-significantly lowered ($p>0.05$) in the experimental group (9.20, SD 1.20) relative to the control group (13.40, SD 2.40). Granulation tissue histology in both groups showed adequate inflammatory infiltrate and neovascularization. Thus we suggest that the wound healing effect of *Ocimum gratissimum* could be ascribed to its reported antimicrobial effects.

The vertebrobasilar territory and posterior Circle of Willis in normal Nigerian Brains: - a Morphometric Study. O.E. IDOWU[1], A.O. MALOMO[1,2], M.T. SHOKUNBI[1,2], & E.E.U. AKANG[3], *Division of Neurosurgery[1], Department of Surgery, & Department of Anatomy[2]& Pathology[3], University of College Hospital & College of Medicine, University of Ibadan, Ibadan, Nigeria.*

The function of the Circle of Willis (COW) depends on the continuity of its roughly circular configuration, which is known to vary (duplicated, hypoplasia, or agenesis). A sound vascular anatomy of the posterior part of the COW is important in the surgery of the

middle and posterior cranial fossae. The purpose of this study was to define and describe the pattern of the vertebrobasilar arterial complex and the posterior COW pattern in our patient population, with particular attention to the sizes, distribution and anomalies of these vessels. Fifty adult autopsy brains were studied. Specimens from patients with an ante-mortem or post-mortem evidence of meningitis or atherosclerosis were excluded. The vertebrobasilar arterial complex and the posterior COW were examined, noting their sizes, area of distribution and anomalies. A total of 56% of the brains had no anomalies. Thirty anomalies were noted in posterior COW compared with six in the vertebrobasilar territory. Seventy three percent of the anomalies in the posterior COW were accounted for by hypoplastic pComAs. The dimensions and distribution of the vessels of the vertebrobasilar and the posterior COW territory in Nigerians are similar to those of Caucasians. These anomalies are more frequent in the region of the posterior COW than in the vertebrobasilar complex. The region of the pComA is the most common site of anomalies in the posterior COW.

Comparative morphometry of the relationship between the sarcoplasmic reticulum, transverse tubules and myofibrils in ventricular myocytes of the hamster and bat. E.E. DENNIS[1], C.N.B. TAGOE[1], R.D. YATES[2], A.S. AYETTEY[1]. *Department of Anatomy[1], University of Ghana Medical School, P.O. Box 4236, Accra, Ghana: & Department of Anatomy[2], Tulane University School of Medicine, New Orleans, Louisiana, U.S.A.*

The mammalian cardiac muscle depends on extracellular calcium for contraction and the sarcoplasmic reticulum (SR), myofibrils and transverse tubules are regarded as key elements in excitation-coupling. During each action potential, extracellular calcium enters the cytosol mainly through the transverse tubule (T-tubule). This calcium in turn induces release of more calcium from the SR that couples with the T-tubule to initiate contraction. The SR network around the myofibrils withdraws calcium from the cytosol to trigger relaxation. We have investigated the relationship between SR, T-tubule and myofibrils in ventricular myocytes of the bat and hamster on the premise that the degree of development of the SR should relate to the cardiac cycle. Comparative ultrastructural morphometry shows that area of myofibrils covered by SR in left ventricular myocytes is 54% in the insectivorous bat (*Pipistrellus pipistrellus*), 40% in the non-hibernating hamster (*Mesocricetus auratus*) and 32% in the hamster in hibernating conditions. Similarly, the area of T-tubules covered by the SR is greater in the bat (23%) than in the non-hibernating hamster (14%) and the hibernating hamster (6%). Other parameters determined including volume densities of myofibril, SR and T-tubules add to the evidence that mammalian cardiac cells are well structured for their different functional capacities, especially in regard to calcium storage for contractile activities.

Studies on the morphological variations of the human umbilical cord. J. AHENKORAH, F.N.L. ENGMANN, A.L. LAWSON. *Department of Anatomy, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra.*

Four hundred and twenty-four consecutive umbilical cords of babies delivered at Korle-Bu Teaching Hospital were studied alongside some birth variables. The range of umbilical cord length was between 23.0 cm to 88.0 cm. The mean cord length was 54.52±10.82 cm. There was a significant positive but low correlation between cord length and fetal weight ($r = 0.228$, $p < 0.01$), cord length and placenta weight ($r = 0.250$, $p < 0.01$), cord length and placenta thickness ($r = 0.118$, $p < 0.05$), and cord length with baby's full length ($r = 0.234$, $p < 0.01$). Placenta weight and birth weight had a moderate significant positive correlation ($r = 0.539$, $p<0.05$). The correlation between maternal age, parity and placenta widest diameter with cord length was non-significant ($p > 0.05$). The cords were mostly eccentrically located on the placentas (87.3%) of the total 424. Non-furcate cords were significantly different from furcate cords in their mean placenta weight, birth weight, cord length, placenta thickness and placenta widest diameter ($p < 0.05$). The danger of furcate cords, possible factors influencing the length of the cord, as well as pregnancy outcome of short and long cords were discussed.

Formation of the endodermal layer in the gastrulation chick embryo. A.L. LAWSON[1,2], G.C. SCHOENWOLF[1]. *Department of Neurobiology & Anatomy, & Children's Health Research Center, University of Utah School of Medicine, Salt lake City, Utah[1], & Department of Anatomy, University of Ghana Medical School, Accra, Ghana[2].*

Gastrulation is an event in the early embryo characterized by an extensive movement of cells. The process results in the formation of the three primary germ layers, namely, ectoderm, mesoderm and endoderm. At its onset, a linear midline thickening of the epiblast, known as the primitive streak, is formed. Subsequently, epiblast cells fated to generate the mesoderm and endoderm undergo ingression through the primitive streak to give rise to these layers. In the present study, formation of the endodermal layer was studies in three ways. First, its primitive streak origin was studies by using supravital fluorescent markers to follow the movement of prospective endodermal cells as they dispersed from the streak. Next, the question of the epiblast origin of the endoderm was addressed by labelling epiblast cells in a region known to give rise to prospective somatic cells, and following their movement as they underwent ingression through the primitive streak. Finally, the relationship between the hypoblast and the endoderm was defined by following labelled rostral primitive-streak cells over a short period of time as they contributed to the endoderm, and combining this with *in situ* hybridization with a riboprobe for Crescent. The results of the study

demonstrate the following: 1. The endoderm of the area pellucida receives contribution mainly from the rostral half of the primitive streak. 2. The epiblast contributes prospective endodermal cells to the primitive streak. 3. As the endodermal layer is laid down, cell-to-cell intercalation occurs at its interface with the displaced hypoblast cells.

Component volume determination by the point-counting stereological method: **Apologia for utilization of Absolute volumes.** F.K. ADDAI. *Department of Anatomy, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra, Ghana*.

When the point counting stereological method is used to determine the volume component of a tissue or an organ, relative volume or volume fraction/density is obtained. This is misrepresented as the volume occupied by the component of interest in the tissue or organ. The relative volume is however the volume of a component per unit volume of the tissue/organ. Given the widely established allometric scaling in mammalian systems, comparisons involving relative component volumes can be misleading. If the actual volume of the whole tissue or organ is determined prior to sampling/sectioning for point counting, the absolute component volume can be obtained by multiplying the relative component volume by the volume of the whole tissue/organ. Data on relative and absolute component volumes of human placentas are presented to show that in most circumstances absolute volumes give more realistic and meaningful comparative results.

Comparative studies on the component volumes of big and small placentas attached to big neonates. S. SHANG QUARTEY & F.K. ADDAI. *Department of Anatomy, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra, Ghana.*

Epidemiological evidence indicates that people born with small (birth) weight and big placentas are six times more likely than those born with big (birth) weight and big placentas to develop adult hypertension or die from ischemic heart disease in middle age. This has provoked the idea that some cardiovascular changes may occur *in utero* when a big placenta supports a small neonate, and that the placenta may help to establish how such change(s) take place. This study compared the histological volumes of eight components of big and small placentas that were attached to big neonates. Placentas from full term, singleton, and spontaneous vaginal deliveries were sampled and processed for point-counting stereology to determine their component volumes. Six components, namely; villi, villous stroma, villous blood vessels, nonparenchyma, fibrin, and villous syncytial knots were statistically more voluminous in big placentas compared to small placentas. Intervillous space and villous trophoblast showed no significant differences. It is suggested from this result that intervillous space and villous trophoblast are the important placental components required to support a big neonate.

Effect of *Garcinia kola* seed extract on ovulation, estrus cycle and fetal development in cyclic female Sprague-Dawley rats. O. AKPANTAN, C.C. NORONHA, A.A. OREMOSU, A.O. OKANLAWON. *Department of Anatomy, College of Medicine, Idi-Araba, University of Lagos. Nigeria.*

The effect of *Garcinia kola* (*G. kola*) seed extract on estrus cycle, ovulation and fetal development in adult female Sprague-Dawley rats was investigated. Cyclic female rats weighing 100 to 150g were used. There were three experimental groups: I, II and III each with a control group. Group I animals were fed with a single oral dose of 200mg/kg body weight of the extract at 0600hr, 1400hr and 1800hr. Group II animals received 200 mg/kg body weight of the extract daily for six weeks, while group III consisted of pregnant rats that received the same dose of the extract on different days of gestation. The control groups received distilled water of equivalent amount in place of the extract. Vaginal lavage was taken daily to monitor the estrus cycle and ovulation. Results obtained showed that ovulation was partially blocked at 0600hr and 1400hr as shown by the reduced number of ova observed in the oviduct from the treated rats compared with control ($p < 0.05$). This was attributed to the inhibitory action of flavonoids of *G. kola* seed on cyclooxygenase II. Moreover the estrus cycle was altered for the first two weeks after commencement of treatment with the extract but returned to normal from the third week. This was indicated by the irregular pattern of estrus with a prolonged diestrus observed in the treated rats. There was a significant decrease in the weight of fetuses from the treated rats ($p < 0.05$) while 7% of the fetuses from pregnant rats that received treatment for the first five days of gestation had malformed left upper limb. These studies have demonstrated that *G. kola* seed at 200 mg/kg body weight alters estrus cycle in rats, partly inhibits ovulation and may produce duration dependent teratogenicity in fetal rats.

Cytoarchitectural and morphometric changes in the testis induced by short and long term administration of quinine in rabbit. A.A. OSINUBI, K.T. AKOSILE, C.C. NORONHA, A.O. OKANLAWON. *Department of Anatomy, College of Medicine, University of Lagos, Idi-Araba, Lagos, Nigeria*

Quinine (QU) is the principal alkaloid derived from the bark of the Cinchona tree and has been used worldwide in the suppression and treatment of malaria for more than 300 years. Though other anti-malaria drugs have superseded QU as a result of the development of resistance to chloroquine and other anti-malaria drugs, the latter has again become an important anti-malaria agent. The aim of this study was to investigate microscopically and stereologically the effect on the rabbit testis of short and long-term

administration of QU. 12 adult rabbits weighing 1 - 1.5 kg were used for the experiment. They were divided into 2 groups of 6 animals each. Half of the first group had 30 mg/kg body weight daily of QU for 7 days while the remaining half had an equal volume of physiological saline. Half of the 2nd group had 10 mg/kg body weight of QU 5 days in a week for 8 weeks while the other half of the group had equal volumes of physiological saline. All the animals were sacrificed 8 weeks after commencement of treatment. Histological sections were prepared and morphometric measurements obtained by simple stereological methods such as diameter, volume density and cross-sectional area of the seminiferous tubules. Microscopic observations of histological sections showed that in animals treated with QU, there was a degeneration of cells of the seminiferous epithelium and a general destruction of the interstitium. No spermatid or spermatozoon was found in the seminiferous tubules of treated animals. Testicular destruction was more marked in animals treated for 8 weeks than in those treated for 7 days. We concluded that QU has deleterious effects on the testis and may possibly disrupt spermatogenesis.

The effects of aloe vera extract (*Barbadensis miller*) on the testis of adult male Sprague-Dawley rats. A.O. OYEWOPO, A.A. OREMOSU, C.C. NORONHA, A.O. OKANLAWON. *Department of Anatomy, College of Medicine, University of Lagos, Nigeria*

We investigated the effect of Aloe Vera (*Barbadensis miller*) on the testis of adult male Sprague - Dawley rats. Twenty-four rats, between 10-12 weeks were divided into 4 groups of 6 animals each. The control (group A) received distilled water and experimental group B to D were given single oral doses of 0.5, 1, 1.5 ml/g.b.w./day of aloe vera extract for 56 days, respectively. At the end of the experiment period, the testes were removed and examined histologically. It was observed that the rats given 1ml of Aloe Vera showed disruption of the interstitium and reduction in spermatozoa, in the lumen of the tubules. The group that received 1.5ml of Aloe Vera revealed degeneration of the basement membrane of the seminiferous tubules, erosion of interstitium and arrest of the process of spermatogenesis on the seminiferous tubules. Wide areas of luminal and aduluminal cellular apoptosis were observed. The results suggest Aloe Vera extract has a dose dependent cytotoxic effect on testicular cellular components. This makes the extract a potential male contraceptive agent.

The *in vivo* assessment of the embryotoxicity of chloroquine in the rat. S.N.A. LARTEY, C.N.B. TAGOE, A.L. LAWSON. *Department of Anatomy, University of Ghana Medical School, College of Health Sciences, Korle-Bu, Accra.*

This research was carried out to assess the embryotoxic effect of chloroquine in the Sprague-Dawley rats using blood/serum concentration levels comparable to those attainable during long term therapy with the drug in humans. Consequently, five dosage regimens (7.5, 10.0, 12.5, 15.0 and 20.0 mg/kg body weight) of chloroquine diphosphate were screened by the HPLC method to select those that will provide blood/serum levels in the (Sprague-Dawley) rats comparable to those achievable during therapeutic use. The dosages of 7.5, 10.0 and 12.5 mg/kg body weight produced peak levels of 1,811.80 ng/ml (3.5 µM) 1,688.31 ng/ml (3.3 µM) and 1125.54ng/ml (2.5 µM) respectively hence were selected from the five dosages since they fell within the expected range. These selected dosages were injected intraperitoneally into Sprague-Dawley rats on day nine and a half of conception to assess their possible embryotoxicity over a 48hr period. These serum levels produced varying degrees of growth retardation in the embryos and more importantly were generally found to be dose related. In the 10 mg/kg/ and 12.5 mg/kg treatments there were significant reductions in yolk sac diameter to 80% and 71%, total protein content to 53% and 45%, head length, 67% and 65%, crown-rump length, 80% and 70% respectively of the controls. There were no significant reductions however, in the number of somites and the total morphological scores measured. They indicated a possible embryotoxicity of the dosages applied even at those relatively low concentrations.

Melatonin attenuates morphologic and biochemical evidence of testicular damage in experimental cryptorchidism. F.I. DURU, L. SAALU, C.C. NORONHA, A.O. OKANLAWON. *Department of Anatomy, College of Medicine, University of Lagos,P.M.B.12003, Nigeria.*

Cryptorchidism is the most frequent anatomic anomaly observed in an endocrine gland. It is a well-identified risk factor in infertility and testicular cancer. Its pathogenesis is multifactorial including anatomical and mechanical, together with endocrine causes. It is believed that increased generation of free radicals and oxidants play an important role in the resulting testicular damage. In the present study, we examined the role of melatonin as an anti-oxidant in protecting the testis against damage in experimental cryptorchidism. Rats were divided into three groups. Group A (intact rats) served as the control. All rats in groups B and C had the left testis returned to the abdomen and anchored to the anterior abdominal wall. Group C rats, in addition had 1mg/kg/body weight of melatonin injected subcutaneously. After 6 weeks, all animals were sacrificed by decapitation and testicular tissue removed for histology and determination of malondialdehyde (MDA), a product of lipid peroxidation. It was found that the melatonin treated animals had better testicular histological profile and testicular lipid peroxidation was significantly more in group B than group C ($P<0.05$). The lipid peroxidation in group C was higher but not significantly different from the control. We conclude that melatonin may confer some protection on the cryptorchid testis.

Pineal gland and pinealectomy in the African giant rat (*Cricetomys gambianus*).F.I. DURU, C.C. NORONHA, A.O. OKANLAWON. *Department of Anatomy, College of Medicine, University of Lagos,P.M.B.12003, Lagos, Nigeria.*

The Pineal gland is recognized as playing vital roles in the regulation of reproductive functions especially in seasonally reproducing quadrupeds, and in the regulation of circadian rhythms among other functions. The gross morphology of the pineal gland in many mammals has been described and is characterized by significant variations. The giant rat, a very fierce rodent is not known to exhibit seasonal reproduction, yet has a relatively large pineal gland (1.34, SD 0.25) mg, a solid mass (ABC type) originating from the dorsal aspect of the diencephalon and extending dorsally to the region of the superior sagittal sinus. The giant rat's pineal gland is divided into deep and superficial portions as observed in the guinea pig and mouse. There is a thin connective tissue capsule but no obvious division of the parenchyma into lobules by connective tissue septa. The animals obtained with life traps from the rain forest area of southwestern Nigeria were found to survive pinealectomy under ketamine hydrochloride anesthesia. The results suggest that the African giant rat could be used as a wild animal model for pineal gland related research.

Effect of cottonseed oil on estrous cycle and ovulation in albino rats. O.B. AKINOLA, O.O. ODERINDE, A.T. ADEJUMO, E.D. BAYODE. *Department of Anatomy, University of Ilorin, Ilorin, Nigeria.*

Cottonseed oil contains a polyphenol, gossypol, reputed for its strong contraceptive importance in male animals. The present studies investigated the effect of gossypol on estrus cycle and ovulation in albino rats. Gossypol at doses of 10 mg/kg/d and 40 mg/kg/d was administered orally to Wistar rats for a period of 15 days. The results showed that gossypol had no disruptive effects on the estrus cycle and ovulation; neither did it reduce the number of oocytes released by the animals.