

Department of Anatomy, BMU

M Phil Part-I Paper-III

Topics for testing teaching ability

(These are topics that call for conception and understanding rather than rote memorisation, and that usually need to be taught by the teachers. Any 25 of these topics have to be selected covering all the subdivisions for the exams of each session and the list should be provided to the students before the exams to help them in preparing for the exams.)

The student should prepare for presenting the topic in a hypothetical class (rather than 'answering'). S(he) should also ask for any teaching material that s(he) wants to use for presenting the topic.

General embryology

Importance of reduction division– explanation with example

Genetic exchange in meiosis– description and implications

Uterine cycle– description and control

Corpus luteum– description, formation, factors responsible for luteinisation and implications

Types of growth according to mechanisms involved

Amniocentesis– definition indications and time, procedure and precautions

Spermiogenesis – time of occurrence, description and implications

Acrosome reaction – definition, characteristics factors responsible and significance

Decidual reaction– definition, characteristics factors responsible and significance

Mechanisms involved in development

Induction– definition, mechanism, examples and implications

Types of growth according to mechanisms involved

Sex differentiation– process, factors involved and their role in the differentiation

Embryonic and fetal age estimation at different stages

Amniotic fluid- formation, functions and clinical significance

Puberty in any one sex– definition, changes at puberty and mechanisms of the changes

Adolescence

Changes in blood vessels at birth

Physiological herniation– definition, reason, description and clinical significance

Prenatal diagnosis

Twining

Cell migration during development

Programmed cell death in development

Organ migration during development (ascent, descent and sideusise)
Left-right differentiation during development
Malformation, deformation and disruption
Principles of teratogenesis
Relationship on blood supply with developmental origin
Relationship of nerve supply with developmental origin
Significance of the embryonic period
Differentiation of mesodermal somites
Ectodermal placodes
Differentiation of the intraembryonic mesoderm
Development of exocrine and endocrine glands
Intraembryonic coelom
Paraxial mesoderm
Chorionic plate
Rotation during development
Cephalo-caudal folding of the embryo
Lateral folding of the embryo
Acrosome reaction
Zona reaction
Capacitation
Implantation
Fertilization
Placental barrier/transport
Nondisjunction
Siamese twins
Puberty
Sexual maturity
Postnatal development

Special embryology

Fallop's tetralogy– description and mechanism of development
Cloacal membrane
Differentiation of the heart tube
Shifting of the venous system to the right during development

Fate of the sinus venosus

Arterial arches

Pharyngeal pouches

Pharyngeal arches

Rotation of the gut– description, result and clinical significance

Development of skeletal muscles in different parts of the body

Detailed mechanism of the ascent of the kidneys

Detailed mechanism of the descent of the testes

True hermaphrodite

Pseudohermaphrodite

Participation of the neural crest cells in cardiac development

Mechanism of development of a specific congenital anomaly (sufficient for a 2-min. presentation)

Evolution/comparative anatomy

Phylogeny repeats in ontogeny

Man has got the features of a mammal

Reproductive anatomy & Fertility

Cryopreservation of sperms

Artificial insemination

Surrogate mother

Gamete intrafallopian transfer (GIFT)

Zygote intrafallopian transfer (ZIFT)

Intracytoplasmic sperm inoculation (ICSI)

Test-tube baby

Cloning

Genetics

Chromosome– structure (in detail)– Watson crick model of DNA structure

classification,

karyotyping sex chromosome and Barr body utility of Barr body.

Chromatin: euchromatin vs heterochromatin

Satellite bodies of chromosome – utility

Structural anomalies of chromosome:

- deletion
- inversion
- translocation
- ring chromosome
- isochromosome
- Numerical anomalies of chromosome:
 - aneuploidy
 - polyploidy
- Mechanism of formation of aneuploidy:
 - non-disjunction
 - anaphase lag
- Homologous chromosomes
- Lyon's hypothesis
- Mosaicism
- Mutation– what, how and where
 - relationship with heritability
- Point mutation
- Frame shift mutation
- Mendel's laws: law of segregation
 - law of independent assortment
- Pedigree chart
- Hereditary disorders vs congenital anomalies
- Genetic disorders- single gene disorders- definitions, examples, characteristics of any specific type
 - polygenic and multifactorial disorders- definitions, examples, characteristics
- Dominance
- Recessivity
- DNA synthesis and redistribution in various types of nuclear division
- Gene
- Different types of gene and their function
- Gene expression
- Gene therapy
- Allelic genes
- Non-allelic genes
- Mechanisms of development of trisomy and monosomy