

Affinities of Prototheria

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Prototherians are fully mammalian in some characters but they also possess a no. of reptilian characters. Thus, this group is a connecting link between the reptilian ancestor from which the mammals evolved and the modern mammals. The prototherians are also sometimes referred to as living fossils as they represent a very primitive level of mammalian evolution.

Affinities with Reptiles :- Although

there is no definite connecting link known between Prototheria and Reptiles, there is enough evidence to show that mammals have a reptilian ancestry. This is supported by following resemblances between monotremes and the living reptiles.

Resemblances - (i) Skull with epi-
teygoid, palatines,

pterygoide, premaxilla and annular tympanic bones. [Pg-2]

2. Vertebrae without epiphyses, except in tail region of Platypus. Cervical vertebrae bear free ribs. Caudal vertebrae with inferior spines.

3. Ribs are single headed.

4. Pectoral girdle, Scapula and with developed acromioclavicular process and without spine. Coracoid and pre-coracoid and in front of coracoid are epicoracoids. In pelvic girdle, epipubic or mammalian bones are articulated with anterior border of pubis.

5. Cloaca is present.

6. Anterior abdominal vein is present.

7. In nervous system, Corpus Callosum is present; connecting two cerebral hemispheres.

8. Cochlea of Internal Ear is with lagena.

9. Ureter opens into the urinary urogenital sinus and duct opens into the bladder.

10. Testes are ~~abd~~ abdominal. Penis is erectile and only used for carrying sperms.

11. Oviducts separately open into the urogenital sinus. Vaginae absent.

12. Females are Oviparous and route of oogenesis.

13. Eggs are large macrolecithal and cleidic. cleavage is mesoblastic.

14. Young hatches out of the egg by breaking the egg shell with the help of caruncle over the head and egg tooth.

Affinities with Aves :- The relationship of prototherians

with Aves (birds) does not have solid facts. The similar characters present in them are chiefly due to the fact that both possess common septation ancestry. Important resemblances are -

- (i) Shape of beak of Platypus resembles with birds.
- (ii) Teeth in both are absent.
- (iii) Feet of both are webbed.
- (iv) Presence of obliterated sutures of skull.
- (v) Tarsal region bears spines.
- (vi) Oil gland is present.

Affinities with Mammals :- The prototherians

are essentially mammals as they possess the following mammalian characters -

- (i) Body covered with hairs. Pinnae (External Ear) is present.

- [Pg-4]
- (ii) Skin is richly glandular and has sweat and sebaceous glands.
 - (iii) Mammary glands are present which open within marsupial pouch through numerous ducts and pores. Nipples are absent.
 - (iv) A typical mammalian diaphragm is present.
 - (v) Skull is dicondylic. chondrocranium is typically mammalian.
 - (vi) Lower jaw is formed of a single bone, dentary.
 - (vii) Middle Ear has three Ear Ossicles. Malleus large, Incus small and stapes elongated, cochlea slightly coiled.
 - (viii) Salivary glands present in buccal cavity.
 - (ix) Lobes of liver typically mammalian.
 - (x) Heart four-chambered.
 - (xi) Only left aortic arch present.
 - (xii) Erythrocytes circular and non-nucleated.
 - (xiii) Optic lobes are four. (Corpora quadrigemina).
 - (xiv) Ejaculatory organ is gland penis whose canal is surrounded by corpus spongiosum.

Specialized characters of Prototheria

1. Hollow facial spur is present over the tarsus bone of male, which is connected to cranial gland whose secretion is poisonous.
2. Milk glands derived.

from Sweat glands, not from sebaceous glands as in other mammals and without teats.

- 3. Development of temporary abdominal pouch (in mammary glands) in female in breeding season, for the development of young.
- 4. Jaw elongated forming a beak or rostrum, bearing external nares.
- 5. Teeth present in young Platypus are replaced by horny plates in adults.
- 6. Presence of epipubic or marsupial bone for the support of marsupium.
- 7. Imperfectly warm blooded, body temp. varies from 25°C to 28°C.
- 8. Right Ovary is smaller and usually not functional.

Conclusion :- Peculiar affinities of Protothris with reptiles suggest an intermediate stage between two groups. Presence of primitive, degenerate and highly specialized characters suggest their early separate line from main mammalia stock. Monotremes show that reptiles, birds and mammals together constitute a natural group more homogenous than the group Ichthyopsida or even the superclass Pisces.

According to Phylogenetic Considerations, (Pg. 6)
two hypotheses have been held:—

1. It is said that Monotremes evolved independently from some early mammal-like reptiles and continued to survive in Isolation.
2. It is believed that Monotremes have been derived from very early mammal-like reptiles with peculiar characters and divergent specialisations.

Among Mammals, the position of Monotremes is very controversial. The Monotremes are without doubt mammals but in view of their reptilian features they may be designated as unfossilised Mammals, which have failed to their evolution into typical mammals. They are not to be regarded as ancestors of higher mammals but as the ancestors of side line of mammalian evolution, having probably originated from some different mammal-like reptilian stock than that from which other mammalian groups evolved.
