

# 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 ancestors 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-  
teygoids, palatines,

- (ii) Skin is richly glandular and has  Sweat and  Sebaceous glands.
- (iii) Mammary glands are present which open within mammalian pores 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) Lobe 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 glans penis whose canal is surrounded by corpus spongiosum.

Specialized characters of Prototheria

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

pterygoide, premaxilla and annular tympanic bones. [Pg 7]

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

3. Ribs are single headed.

4. Pectoral girdle, Scapula and with developed acromiary process and without spine. Coracoids and pre-coracoids and in front of coracoids are epicoracoids. In pelvic girdle, epipubic or marsupial 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 ~~in~~ abdominal. Penis is erectile and only used for carrying sperms.

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

12. Females are Oviparous and routine gestation.

13. Eggs are large macrolecithal and cleavage is meroblastic.

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 reptilian 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.

- 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 is breeding seasons 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 Protothia with reptiles suggest an intermediate stage between two groups. Presence of primitive, degenerate and highly specialized characters suggest their early separate line from main mammalian stock. Monotremes show that reptiles, birds and mammals together constitute a natural group more homogeneous than the group Ichthyopsida or even the superclass Pisces.

According to Phylogenetic Considerations, <sup>(Pg. 11)</sup>  
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 specializations.

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 unfinished 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.

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