

## What to know?

Characteristics of Coelurosaurs (When did they live? What did they look like? What characteristics did they share with birds?)

- Cretaceous
- Small
- Used hands or feet
- Possess some characteristics of living birds

Late Triassic-late Jurassic

Furcula, fused bony sternum, t-rex proteins, bird like egg brooding posture

Within-> tetanurans > theropodomorpha > saurichia> dinosauria>archosaurs > diapsida> saurapsida> amniota> tetrapoda etc. Contain: maniraptorans which contains tyrannosaurids, dromeosaurs & birds

Characteristics of Dromeosaurs (When did they live? What did they look like?)

- Cretaceous
- Small
- Large toe and claw, 2nd digit
- Feet similar to birds
- Remarkable tail structure
- Used fore feet to seize prey

Late Cretaceous

- bipedal, cursorial & terrestrial predators
- arms used to aid in bipedal running for balance like chicken eventually evolved to short flights  
THIS THEORY DROPPED
- terrestrial origin - arms used to catch prey by swatting it down or for horizontal jumps & incline running
- \*arm & wrist movements seem to be consistent w/ prey seizing & feathered forelimbs poorly suited 4 flight

1<sup>st</sup> airsacs & endothermy

Characteristics of Pterosaurs (When did they live? What did they look like? How did they

differ from modern birds?)

-Box 16-3

-Triassic

-Wing different than birds

-Flight mechanically demanding

Some similarities with birds

Late Triassic-end of Cretaceous period

Walked on four legs when they were on land, compared to birds' strictly bipedal postures

Most pterosaur skulls had elongated jaws with a full complement of needle-like teeth.

**Shared characteristics between theropods and birds**

Hollow, pneumatic bones; Elongate, mobile S-shaped neck; Tridactyl foot; Digitigrade posture; Ankle joint forms between tarsal bones rather than tarsals and tibia/fibula; Feather precursors or true feathers; Reduced genome size

**Feathers - how did they evolve? Know the differences (and the importance of these differences) between filamentous feathers, symmetrical vane, and asymmetrical vane**

Genes of interest

-Sonic hedgehog

-bone morphogenetic protein 2

Stage 1: feather follicle precursor (placode)

Stage 2: follicle differentiation 2 layers

Stage 3: Rachis & barbules form

Stage 4: Distal & proximal barbules develop

Stage 5: sheetlike surface of pennaceous vane

**Archaeopteryx**

**Hypotheses for the origin of flight**

**Examples of extinct "birds"**

***Jeholornis prima***

Early Cretaceous from China

Bird like wings, thorax, skull

Dinosaur tail

Teeth

Short rounded wings

### ***Confuciusornis***

-early cretaceous

crow sized

elongated tail feathers

several species in the genus

fish eating

toothless beak convergent w/ ornithomies

pygostyle

### **Dromeosaurs - cursorial terrestrial predators**

-grasping arms

-swivel wrist joint

-posteriorly directed pubis

### **Caudipteryx - Basically terrestrial w/ flapping flight**

- Symmetrical vaned feathers on wings & tail

-Down like feathers on body\*

-long tail

### **Archaeopteryx - basically terrestrial w/ flapping flight**

- asymmetrical vaned wing & tail feathers

-longer arms

-reduced tail

### **Iberomesornis - arboreal**

-strut-like coracoid

-fused pelvis