ORIGIN, EVOLUTION AND DEVELOPMENT OF FEATHERS

FINAL DEGREE PROJECT
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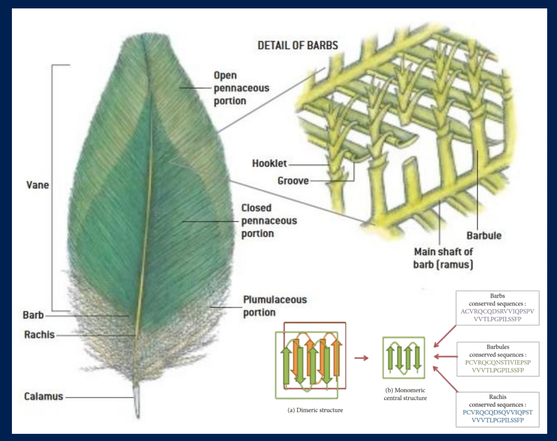
María Laso Rodríguez
UAB
Universitat Autònoma de Barcelona

OBJECTIVES:

This final project attempts to highlight the key points about the origin and evolution of feathers, as well as how the development process could have been involved.

FEATHERS NOW:

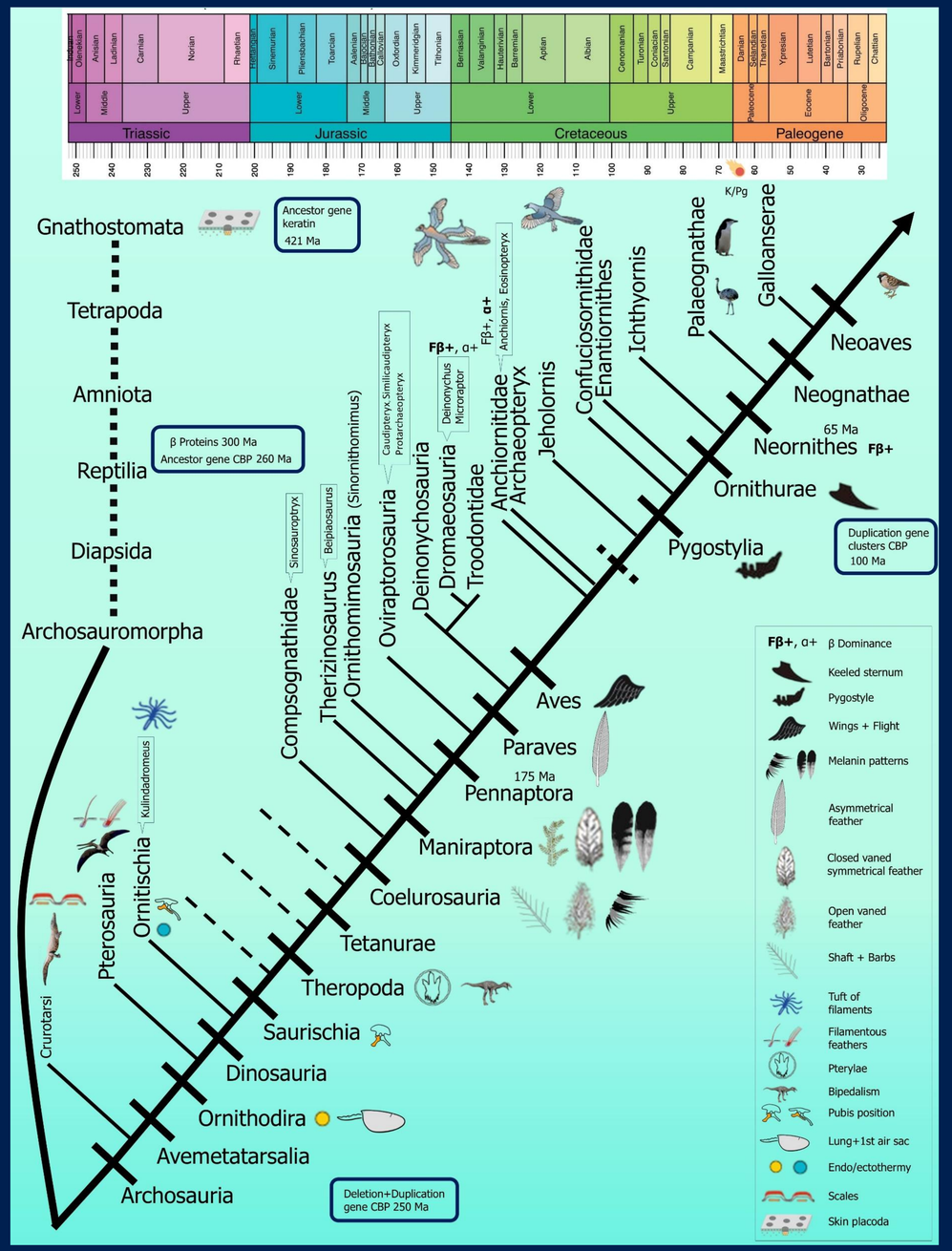
Feathers are the most complex integumentary structure of vertebrates. The three-level branching system and feather β-keratin composition provide them with lightness, flexibility and resistance.



They are the best defining avian feature and their multiple shapes and functions were essential in their success in colonizing all habitats.

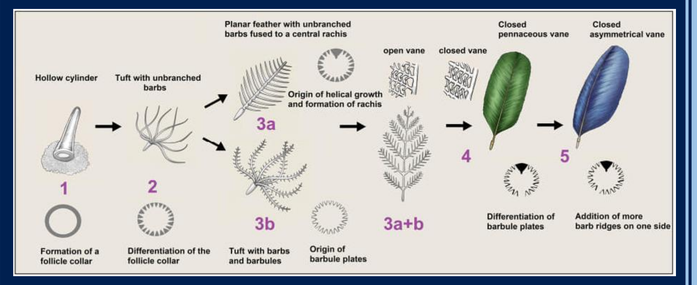
FEATHERS BACK THEN AND SINCE:

But feathers are no longer exclusive to birds and their origin dates back to the dinosaurs or, even further back in time, to the pterosaurs. Actually, genes, keratins, feathers, and functions have come a long way, spanning millions of years, to the present day.



THE EVO-DEVO MODEL:

The Prum's development model proposes an hypothesized transitional series of feather follicles and morphologies that represents the steps in the evolution of feathers, from an unbranched hollow filament (stage I) to a closed pennaceous feather with an asymmetrical vane (stage V).



According to this model, any theory should include the corresponding development mechanisms, and the decisive innovation was the evolution of the follicle.

CONCLUSIONS:

- Feathers predated birds and flight.
- Molecular pathways came before structure, and structure came before function.
- The development model is consistent with fossil evidence and is based on the ontogenic mechanisms necessary to create a novel structure. It aims to be a functionally neutral model, where morphology is not inferred from function.