

BEYOND THE APPENDIX: VESTIGIAL STRUCTURES

3

(1) Imagine at some point in the past, your human ancestors had a third eyelid, a tail, large powerful jaws with crushing teeth and they had the ability to make their body hair puff up to make themselves look more threatening? This isn't fantasy fiction; proof of these ancestral structures are found all over our bodies and they are called vestigial structures. Vestigial structures have lost their ancestral functions, but they are still retained by the body in some reduced form. Sometimes vestigial structures serve new roles which are different from their ancestral ones and sometimes they serve no role at all.

(2) If you've ever seen a cat swivel and move its ears in response to a noise, while keeping the rest of its body and face immobile, then you've seen the auricular muscles surrounding the outer ear in action. In humans, our ability to move our ears independently of our head has been drastically reduced though the auricular muscles remain. This suggests that in the past, our sense of hearing was much more important to survival than it is now. What use do we have for these muscles today? For those who can still move their ears a bit, they can perform a cool party trick to impress guests.

(3) Wisdom teeth are the third and last set of molars to grow in. Molars are specialized to crush and grind tough and fibrous plant material. This indicates that at some point in our ancestry, we used these teeth to eat a lot of uncooked plant material. As human diets changed and humans developed the ability to cook foods, which are softer, we lost the need to have the large and powerful jaws of our predecessors, yet pesky wisdom teeth still insist on erupting from our smaller jaws. Often when this happens, the jaw does not have enough room to accommodate this last set of teeth. If the jaw is too small, wisdom teeth become impacted, meaning they can't fully emerge due to blockage by other teeth. This can cause the wisdom teeth to grow sideways and painfully force other teeth together.



(4) Have you ever thought about your "third eyelid"? Probably not, but at one point in our past, humans had another eyelid made of a transparent membrane covering which could be drawn over the eye for protection while still allowing for vision. Some reptiles, birds, sharks and mammals still retain full or partial membranes. This "third eyelid" is called the nictitating membrane. Modern humans only have a vestigial remnant of this membrane and it is found as a bulbous structure located at the inner corner of the eye. It is called the plica semilunaris.



Cat Nictitating Membrane, Photo by Nika Jiadze

(5) If you feel like something is missing in your life, it may be that you are feeling bad about your long forgotten tail. Your ancestors had a tail and all that remains of this structure now is your coccyx, otherwise commonly known as the tailbone. It is the last structure found at the bottom of your spinal column. Interestingly, during human stages of embryo development, embryos develop a tail which becomes most prominent on day 31 to 35 of development, after which time the tail begins to slowly recede. As it does for many animals with tails, a human ancestral tail would have aided us in balance and mobility, especially when walking on all four limbs. Though we are now tailless, the tailbone has some important functions. It is the attachment site for many important muscles and ligaments and it contributes to the load bearing part of the pelvis.

BEYOND THE APPENDIX: VESTIGIAL STRUCTURES

3

(6) Since the appendix is the most famous vestigial organ, let's give it a closer look. It is often mistakenly thought of as a "junk organ" with no function. However, the appendix stores large populations of beneficial bacteria. When hygiene and sanitation was poorer for early humans, the appendix potentially played an important role in repopulating our intestines with beneficial bacteria after instances of diarrhea. These days, improved cleanliness reduces the importance of the appendix's role in human health. An appendectomy is a procedure that removes an inflamed appendix, and many patients report no significant adverse effects from its absence.

(7) Not only do we have vestigial structures, we also have vestigial body responses and reflexes. Goosebumps, also called piloerection, is one response we have to stress. A band of muscles, called arrector pili muscles, join the hair follicles under your skin to your connective tissues. When these pili muscles contract, they cause the hair to stand away from your body. In our hairier days, the raised hair would have made us look larger and more menacing to scare away the predators in our environment. The response remains, but without an adequate amount of body hair, piloerection is not very intimidating.

Article Questions

- 1) What is a vestigial organ?
- 2) What were wisdom teeth used for and why do they give some modern humans trouble?
- 3) What is the human vestigial structure for the nictitating membrane and where is it located?
- 4) In what situations would your appendix prove useful and why?
- 5) Why are goosebumps not very useful to modern humans?

- 6) Match the following statements with the correct term.

Statements

- ____ 1) The vestigial structure of the tail.
- ____ 2) Goosebumps.
- ____ 3) These help move ears.
- ____ 4) A transparent membrane that covers the eye.
- ____ 5) The removal of a part of the digestive tract.

Term

- A) piloerection
- B) auricular muscles
- C) nictitating membrane
- D) appendectomy
- E) coccyx