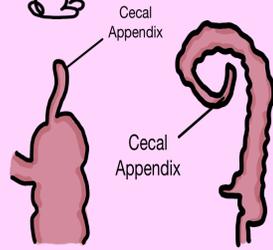


Convergent Evolution of the Cecal Appendix in Mammals: Rabbits and Humans

By: Stephanie Torres



Morphology of the appendix in Humans (left) and in *Oryctolagus cuniculus*, rabbit (right)

Source: Palevol Reports
(Adapted from Smith, et al., 2013)

What is the Cecal Appendix?

- A section of tissue extending from the cecum, the end of the large intestine, with lymphoid tissue in the gastrointestinal tract.
- It has evolved roughly 32 times and been lost less than 7 times in mammals.
- It's described as a safe-house for good bacteria, but its function has evolved along with its morphology across mammals, as seen in the illustration on the left.
(Smith, et al., 2013)

Where did it originate?

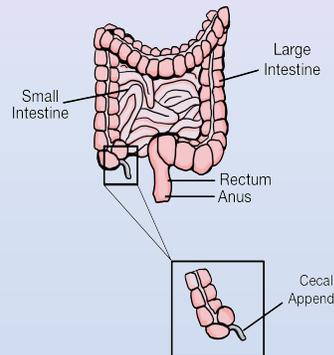
Studies suggest it's been 80 million years since the appendix first came about in mammals and has been positively selected for throughout time.

(Collard, et al., 2021)

What does it do?

There's ongoing research to establish its function across species. However, it's been speculated that in extinct ancestors it allowed digest leaves and grasses. In extant mammals its thought of as a mutualistic relationship between the gut biome and the host.

(Laurin, et al., 2011)



Human digestive tract, depicting the location of the appendix

Image Source: drawn by Stephanie Torres

Why is it considered vestigial in humans, but not in mammals like rabbits?

Charles Darwin hypothesized that the appendix evolved to a vestigial organ due to its reduced cecal size since humans can't digest the high cellulose diet that distant ancestors consumed. The appendix in rabbits has evolved to provide antibody diversification, while in human an unfavorable evolution has led to acute appendicitis in many cases. As a result, it's thought that the appendix is a dispensable organ with little significance to good human health, unlike rabbits that benefit from having it.

(Smith, 2013; Nicoletti, 2018; Collard, 2021)

References:

1. Collard, M. K., Bardin, J., Laurin, M., Ogier-Denis, E. 2021. The cecal appendix is correlated with greater maximal longevity in mammals. *Journal of Anatomy*. 239, 5: 1157-1169.
2. Laurin, M., Everett, M. L., Parker, W. 2011. The Cecal Appendix: One More Immune Component With a Function Disturbed By Post-Industrial Culture. *The Anatomical Record*. 294, 4: 567, 579.
3. Nicoletti, A., Di Girolamo, N., Zeyen, U., Selleri, P., Masi, M., Fonti, P. 2018. Ultrasound morphology of cecal appendix in pet rabbits 21, 4: 287-291
4. Smith, H. F., Parker, W., Kotzé, S. H., Laurin, M. 2013. Multiple independent appearances of the cecal appendix in mammalian evolution and an investigation of related ecological and anatomical factors. *Comptes Rendus Palevol*. 12, 6: 339-354.