Is the human pharynx poorly designed?

Jerry Bergman

The concept of dysteleology claims that much poor design exists in the natural world, and therefore an intelligent creator does not exist. A look at a supposed common example of dysteleology, the design of the human pharynx, shows that it is in fact evidence for superior design.

The dysteleology argument

The entire dysteleology argument is based on the recurrent assertion that there exist many examples of poor design in the human body. As knowledge of life improves, dysteleology claims have likewise been correspondingly disproved. The argument from dysteleology is not *scientific* support for evolution, but, instead, is a claim about the Creator's attributes—what some people believe that God would or would not do. This argument, for this reason, is theology, not science. Scientists speak theologically, not scientifically, when they imply that a creator would not design a structure in ways that they believe may be superior to the existing design.

Dysteleology has become very popular among many Darwinists, not because it is based on scientific evidence or on logic favouring evolutionism, but because it seems to be a useful argument against intelligent design which appeals to popular opinion. A problem with this argument is that Darwinists argue that the body is poorly designed, and conversely they also argue that science cannot make judgments about design because claims in this area are outside of science—judgments that science cannot entertain because it assumes *purpose* in nature. Either science can make judgments about design, or it cannot. Both cannot be true. One common claim of poor design is the human pharynx.

Evolutionary claims

A noted zoologist teaching at a major university claimed that the human pharynx is a poorly designed system, explicable only in terms of macroevolution. The example he gives is designing a building with water and gas entering through a common chamber so that whenever one is needed the other would have to be shut off. He claims this design

> '… would be the height of stupidity. But that is what your "intelligent Creator" did when he designed and created man for, as you know, the pharynx serves as a common passageway for air and water. Think of the number of lives that have been lost by food or water getting into or obstructing the air passageway. It certainly would have required very little intelligence for the Creator to have designed a more efficient and less dangerous arrangement. … However, if you trace the evolution of the head and especially the development of the food and respiratory passageways from the fishes up through the amphibians, reptiles and early mammals to man, you will note that the relationship turns out to be a masterpiece of evolutionary achievement enabling aquatic organisms to become adapted to air breathing and thus capable of living on land.'[1]

University of Michigan Professor Scott Atrain writes that the problem is the mouth cavity in air breathing terrestrial animals

> '… does double duty, as an opening to take in both food and air. As creatures evolved from water onto land, the opening to the respiratory system was jerry-rigged to share the preexisting digestive tract's anterior structure, including the mouth and pharynx [throat]. In terrestrial vertebrates, the pharynx became a short passage linking the mouth to the esophagus and the windpipe. Any mistiming of the swallowing mechanism that blocks off the air passage in routing food to the esophagus causes choking.'[2]

Skybreak, in her new book endorsed by several notable evolutionists, including Richard Leakey, P.Z. Myers and Kevin Padian, wrote that humans 'have a dangerous tendency to choke on food' because the

> '… passage that air follows to get to the lungs actually *crosses* the path that food follows to get to the stomach. This would be an example of a really stupid (or perversely sadistic) design *if* a god had actually designed it that way! But this is not the result of anyone's conscious "design". This choking problem simply reflects our own past evolutionary history: the breathing channels of all land vertebrates also evolved in the distant past as *modifications of pre-existing structures* (in this case the "air bladders" of some bony fishes and lungfishes) which evolved into primitive lungs.'[3]

Analysis of the design

An analysis of the pharynx's design eloquently proves that the claim of poor design is false. In fact, the pharynx is an example of a superbly designed complex system. The pharynx serves as a single passage for three systems—the respiratory, digestive and communicative—for many very good reasons. A major one is, unlike other primates, our airway and esophagus intersect. This can cause choking, but allows speech.[4]

The pharynx connects the air channel to the alimentary canal. This design allows disposal of both excess moisture in the air channel, and the debris in the lung system that is filtered from the air by bronchial mucus. The mucus is moved up out of the lungs by cilia and is then swallowed. The design allows the creation of air pressure bursts, a response called coughing

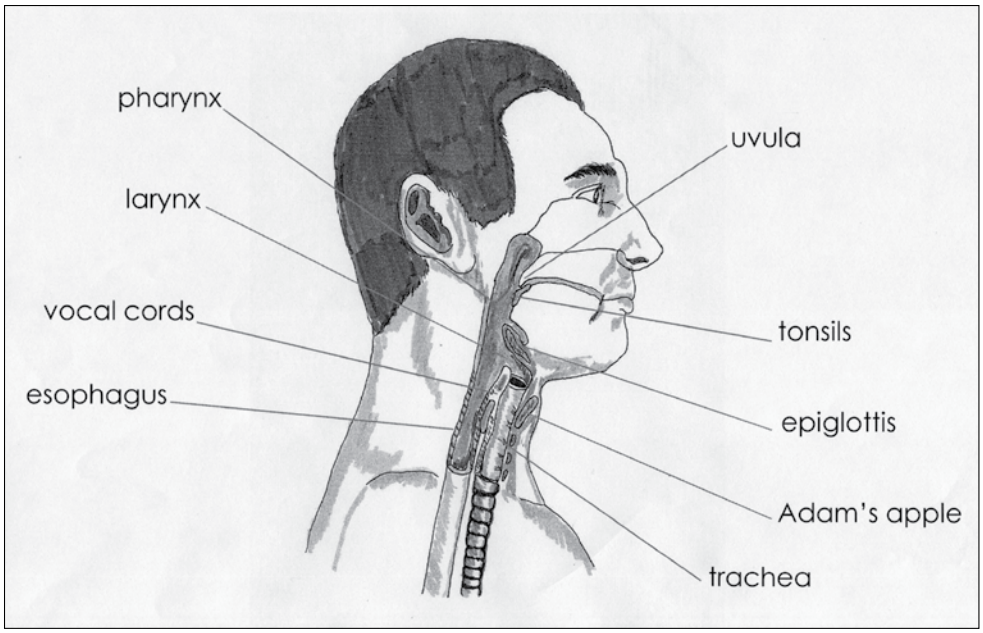

Illustration by Brenda Lindley Anderson

Cross section of the human pharynx showing the major structural parts involved in breathing and swallowing.

or sneezing that is necessary to remove irritants from the throat and nose. This system is critical to force out objects, such as food which can occasionally get stuck, in the area of the food tube above the epiglottis or in the back of the mouth.

The pharynx structure permits the mouth and nose to alternate as breathing ports—a feature that is critical whenever the nose is plugged, as when suffering from a cold, or the mouth is blocked, such as when it contains food. The nostrils are used when there is a need for breathing normal quantities of warmed, humidified, filtered air, and the oral cavity allows rapid entry of much larger quantities of air when needed. The tongue, teeth, palate, mandible and cheeks are all necessary for manipulating food, but they are also required for speech.[5] These structures, called articulators, have critical functions in the formation of vowel sounds.[6] The two-tube design would require two separate mouths, tongues, teeth and other structures, duplicating many of the same structures, using one set for eating and the other set for speaking.

The pharynx design allows both simultaneous eating and breathing with greater efficiency and less body bulk than if we had two separate unconnected channels. Importantly, one cannot breathe and swallow at the same time, effectively separating the two systems. The two separate systems also function exceptionally well because unconscious reflexes, in the absence of disease, allows them to function without concern or worry for most of our life. Critics argue, without empirical evidence, that completely separate tube systems, one for respiration and another for the alimentary tract, would be a superior design. This design, though, some argue based on knowledge of anatomy and logic, would require a far more complex tube and networking system, resulting in a greater likelihood for errors and casualties. Two systems would have to be coordinated so they could operate separately.

Another problem with this design is the more body openings there are, the more difficult it is to protect the body from pathogens. By using three openings instead of the present one, the likelihood of infections would also increase significantly, and pathogen protection would likewise need to be increased. Given how many pathogens we take into the oral cavity, two oral cavities would cause more problems with infections.

Another problem is that the sense of taste is intimately involved in our sense of smell. For this reason, the olfactory sense used in both eating and digestion is also part of the respiratory system that allows us to 'taste' our food. Otherwise, food would be tasteless, such as occurs when we have a heavy cold. Separate systems would require a totally different design, which would be impractical.

Humans, unlike apes, have a 'descended larynx' (meaning it is located much farther down the trachea toward the lungs than it is for all other primates). In humans, the larynx actually sinks *lower* as the baby grows until, in adults, it is located at the junction of the food tube and larynx (windpipe) directly below the base of the tongue. Rice adds that the 'long larynx' in humans is what allows humans to choke but also allows humans to use language.[7] Furthermore, so far as is known, this design feature exists in one primate only—*Homo sapiens*.[8] This design allows speech in humans—the only life form on Earth that has complex language—which is a major reason why Darwinists argue that a descended larynx must have evolved first, and only later was speech able to evolve.[8] This design feature also makes gulping large amounts of air very easy, a very useful trait for under water swimming.

Many critics of the design argument commit the logical fallacy of 'special pleading' by calling the human pharynx design 'the height of stupidity' when discussing creation, but view the pharynx as a masterpiece of engineering when they attribute its design to evolution. This illogical reasoning is unfortunately common in debates on origins. The fact is, pharynx design serves several functions efficiently and effectively.

The problem of abuse and disease

When food or water enters the wrong tube (the trachea) it is not because the system is poorly designed, but it occasionally malfunctions because of abuse, such as eating while under the influence of alcohol or someone applying first aid incorrectly. People do not die because of a poorly designed pharynx, but rather because of its abuse or disease.

In support of their claim, poor design advocates cite statistics on choking. Humans swallow about 1,000 times a day or 27,375,000 times in an average lifespan. Given this fact, life threatening choking events is actually a comparatively very rare event when compared with the number of swallowing events during a lifetime. It is most common in very young children, often caused by swallowing small toys, hard candy or gum—all things that small children should not have.[9] The most common choking problem is with infants under six-months old. Over half is non-food related and most is due to lack of proper parental supervision. The next largest problem is in the elderly, often caused by disease such as strokes, Parkinson's, Alzheimer's, Myasthenia Gravis, Amyotrophic Lateral Sclerosis, Cerebral Palsy, Multiple Sclerosis or some type of dysphagia (the medical term for difficulty in swallowing which could be caused by many factors such as nerve damage to the swallowing reflex). A final group for which choking is a problem is the developmentally handicapped.

For healthy adults, the most common problem is eating too fast, trying to swallow too large a portion of food, talking or laughing while eating. All of these problems the Heimlich manoeuvre[10] can usually solve if properly applied. Irresponsible behaviour involving excess alcohol and inebriation is a major factor involved in choking, as is eating too fast and not properly chewing one's food. Improperly chewing certain foods, including especially steak, is often implicated in chocking. Eating too fast and not cutting up one's food into small enough pieces tend to go together. Another serious problem is the aspiration of food into the lungs. This can cause pneumonia and can be lethal. This comparatively rare event usually occurs in stroke victims or others who have nervous system damage that interferes with proper functioning of the complex swallowing system.

The system is so effective that multi-millions of people have consumed three meals a day for a lifetime without problems. Swallowing causes the pharynx to stimulate several very complex reflex responses. The first shuts off the passage into the nose by raising the vellum, and the next closes the opening of the trachea with a flap called the epiglottis, and another that pushes the food down into the top of the esophagus. The human soft palate elevates in order to close off the nasopharynx, a very different design than that used in all primates.

In the vast majority of cases problems only arise with a misuse or degeneration in the system. This cannot be used as evidence of bad design because good original design takes into account neither unwise usage of the design nor subsequent degeneration of the system. Rather, this is expected within the biblical model, as the Fall has produced degeneration and was caused by (and produced more) unwise choices!

Conclusions

When the oral cavity's many functions are carefully considered and compared to other possible designs, shows that the 'bad design' claim is invalid. There are at least a dozen important reasons for its existing design. The only way to scientifically prove a system is better is to do a scientific comparison of two groups, one group that uses each system. This experiment will never be done as it would require major surgery and likely would create serious health problems. Evolutionists trying to defend their claims could at least explore the many changes required to produce two separate functional systems, something that no one has done. Darwinists who criticize the existing system have not proposed the details or any evidence of a functional better design.

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10. The Heimlich manoeuvre is performed by a person standing behind the person choking and exerting upward pressure on the diaphragm of the patient to compress the lungs and force air out through the trachea, hopefully dislodging the choking object in the process.

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