Patients and Evolutionary History

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Evolution has revolutionized our modern scientific understanding of natural history and how our bodies came to be. Yet evolutionary insights regarding health and disease are not typically emphasized with patients.

Medical education focuses on proximate causes of disease -- infection, trauma, cellular regulation, etc. -- as opposed to evolutionary understandings of how our traits and responses came to be in the first place. What evolutionary insights are there for clinical medicine?

Medical conditions can occur when there is a mismatch between our evolved bodies and our particular society and environment. This idea challenges some of our notions of disease.

Hardly a day goes by when I don't see patients with lactose intolerance, allergies, obesity, anxiety, near-sightedness, ADHD, and flu symptoms. The lactase gene spread rapidly in historical populations with dairy husbandry. But 70% of the world's population is lactose intolerant, all of whom are "normal" in the context of their environments that were, until recently, lactose-free.

Allergies and autoimmune conditions are more common in developed societies where infections occur less frequently. This suggests a mismatch between our evolved immune system and our current environment. Recent evidence suggests that the incidence of autoimmune Crohn's disease has risen in places where the incidence of gastrointestinal worm infection has fallen.

Obesity likely represents a mismatch between our food preferences which evolved in environments of relative food scarcity, and modern environments with increased food availability and decreased activity levels.

Anxiety may have been an evolutionarily useful response -- think of the advantage of being jumpy when you hear rustling in the tall grass in an African savannah -- but now may be an inappropriate expression for our current environment.

According to a recent study, children who are genetically susceptible to near-sightedness are less likely to become nearsighted if they spend more time outdoors. This suggests near-sightedness may in part result from a mismatch between the outdoor environment in which we evolved and modern indoor activities such as reading and playing video games.

With an evolutionary perspective, conditions such as attention deficit hyperactivity disorder may be conveyed not as a disease, but rather a mismatch between a patient's evolved nature and our particular society's educational expectations. In all these conditions, an evolutionary approach

helps clinicians and patients see medical conditions as contextual, rather than as an inherent defect. Evolution -- natural history -- becomes relevant.

Fever, cough, vomiting, diarrhea, etc. are evolutionary host defenses to expel infections, not, as patients often believe, infections themselves. Nonetheless the suffering can be marked. If treatment is provided to alleviate these symptoms, will our body's defense against infections be weakened? This area is ripe for additional scientific research.

Like the early days of pharmacology and microbiology, it is too soon to predict the extent of clinical relevance that an explicit evolutionary understanding can yield. Evolutionary thinking has already directly impacted clinical medicine in areas such as genetics and vaccine design. Evolutionary principles also inform public health measures, such as the campaign to avoid inappropriate antibiotic use in humans and livestock to help prevent the evolution of resistant pathogen strains.

Just because a trait evolved does not make it good or bad. Evolution itself is impersonal and morally neutral. It is up to us to provide deliberate values into the blind shuffle of evolutionary selection. An evolutionary scientific understanding provides greater wisdom into health and illness. Even in this world of technological marvels, the "history and physical" (H&P) is often emphasized as a physician's most valued diagnostic strategy. In essence, evolution is history. With an evolutionary perspective, the "H" in "H&P" can be understood and appreciated at a deeper level.

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