



THEME 02

The sterile human and the biomedical disease model

HEALTHCARE

DISEASE

WORLDVIEW

Viruses and bacteria don't have the best of reputations. They're dangerous pathogens and in the past century, they've mostly been known as the culprits in virus pandemics and well-known infectious diseases. This image is characteristic of the biomedical disease model, according to which intruders threaten our health. The biomedical disease model has led to great progress but is also subject to much criticism. In the past decades, there has been growing interest in alternative disease models with a new outlook on what it means to be a healthy human being.

Our observations

- Microbiologists are gaining insight into the complex relationships between us and micro-organisms. From these studies on the microbiome, a [more positive image of micro-organisms](#) is emerging than the one common to the dominant biomedical disease model. More and more studies highlight the [useful](#) or even [crucial](#) aspects to our health of viruses, bacteria and fungi. Consequentially, researchers and medical professionals are calling for a better distinction between the normal, good elements of the microbiome and those that are detrimental to us humans.
- Scientists are also beginning to view nutrition in a different light. Besides a merely mechanical perspective on food, we're becoming susceptible to a communicative and informative outlook. Dominant in our view on food are metaphors in which food represents [nothing more than energy](#): food as fuel to keep the engine of our bodies running. In an informational perspective on nutrition, food is seen more as a conversation, and is attributed, besides energizing properties, autonomy and communicative skills. For instance, the [genes our food contains can regulate our own genes](#).
- In psychiatry in the '80s, a strong conviction became prevalent that mental disorders could be captured [in a biomedical model as brain diseases](#). The progress that had been made in the neurosciences had created the expectation that, in the near future, it would be possible to classify all disorders in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) as brain disease with a clear cause. Because of disappointing results, after the turn of the century this neuro-centrism was widely criticized, paving the way for [alternative disease models](#) that ascribe more importance to psychosocial factors

Connecting the dots

Of course, that bacteria can be beneficial to our health isn't new information in medical science. And yet, the [history of medicine in the 20th century](#) can be read as mostly a battle against bacteria, which began with the [germ theory of disease](#) and the discovery of penicillin.

The germ theory of disease was partly responsible for the [dominance of a biomedical disease model](#) in modern medicine. According to this model, there is a straightforward relationship between cause and condition and a clear course of disease, [clearly summarized in Koch's postulates](#). This functionalist disease model encompasses a mechanical perception of the body. Disease is naturalistically understood as the dysfunction of organs and therapy is focused on recovery and restoring the affected functions. Health then simply comprises the absence of disease; the machine functioning as it should.

Historically, the dominance of the biomedical and functionalist disease model has led to great progress. Sterilization techniques were developed, as were medicine and therapies to effectively debilitate invaders, we learned to disinfect and keep our environment "clean". Our current life expectancy would have been unthinkable without the biomedical disease model. This "sterile human" has a resistance to infectious diseases and a general level of health unparalleled in human history.

Despite these successes, the biomedical and functionalist disease model has been under fire for decades. Critics argue that the model is too unilateral and unable to explain a plethora of illnesses and phenomena. Auto-immune diseases, for instance, are difficult to classify within the model, hormone diseases are more likely to be the result of disrupted homeostasis and we underestimate the role of our emotional life in the course of a physical disease.

Moreover, the dominant biomedical and functionalist disease model still seamlessly fits an anthropocentric worldview, in which the human as a ruling subject is cut off from his environment and is especially attuned to the menacing side of external nature, a nature which can be used for human gain if we so desire. This view of humanity has long been under fire too. New insights from (among others) modern biology, integral medicine, psychiatry and ecology are difficult to reconcile with the dualism of anthropocentrism. In the past decades, these sciences have shed new light on what it means to be human. A different worldview is emerging in which the world is no longer seen as a large mechanical clock, but as an organic whole in which continual mutual interaction and transference of information take place on different levels of existence. "Subjects" then are not cut off from the world, but only are or become something or someone in relation to others and the environment.

This new worldview lays the groundwork for a different understanding of disease and health, which have received more attention in the past decades. In this transition from the Anthropocene to what we could call "the [Microbiocene](#)", we are given the impression that being healthy demands continual exchanges between humans and their environment. Our kind is not just in danger, we would also benefit from

this continuous exchange between us and, for example, the bacteria and viruses in our surroundings. This exchange, however, encompasses far more than we can comprehend and control. In this view of humankind, the ability to self-heal of nature and the ecosystems in which we live, are highly valued and trusted. Key concepts around this idea of health are balance or homeostasis, self-regulation, adaptation, motivation and adjustment. The phenomenon of being ill also becomes more complicated than in the unilateral biomedical model. Disease arises from an interplay of a number of relationships that are impossible to oversee for us humans, which is why we always overlook some of them.

This new perception of disease and health results in contrasting ideas about medical intervention. Intervention and sterilizing humans and their environment can lead to immediate and quantifiable gains for the sterile human, but in accordance with the new worldview, it can also result in imbalances and vulnerabilities in the long-term. One of those new vulnerabilities has come to light in studies on antibiotics. Medics have been expressing increasingly vehement concerns over the unbridled growth of antibiotics, which is leading to antimicrobial resistance, now globally [recognized as a serious problem](#).

Should medical practitioners then intervene less, as advocated by the anti-vaccination movement? On the one hand, the new worldview appears to implicitly call for more *laissez faire* and restraint when it comes to medical intervention. Human hubris regarding nature should make way for more modesty. The worldview prevents us from suffering iatrogenesis, harm caused by medical treatment. On the other hand, the common purpose of medicine lies largely in therapy through intervention, interventions have proved extremely successful (e.g. in the treatment of measles and pox), and the possibility of treatment causing harm is not sufficient reason to refrain from intervening.

The question therefore begs nuance: how do we retain what led to progress in the unprecedentedly successful functionalist and biomedical medicine, while also being more attuned to the vulnerabilities and imbalances it may cause?

The embedding of biomedical intervention in a more complete disease model that's better suited to the complexity of disease and health appears to be the right way forward. The [more dynamic and procedural disease models](#) found in psychiatry might be a good starting point. In these models, disease and health are not discrete entities but located on a continuum. They often do not have a clear-cut beginning or end, and there is often no apparent distinction between cause and effect or pathogen and symptom. In this ecological perspective, when designing a therapy, all manner of biological, psychological and social factors are weighed against each other. From this perspective, the biomedical model generally fixates on only one point or temporary condition in this complex relational field, such as the point when a virus in a human body begins multiplying uncontrollably, thereby damaging the organs. This interventionism of the biomedical model is an indispensable tool of medicine but is thus also viewed from a broader perspective on health.

Implications

- **The current battle against the coronavirus shows the implications of the contrasting disease models and worldviews. The biomedical model is particularly suited to answering the question how to intervene now, how to contain the spread of the virus and develop an effective vaccine. But if we want to answer the question how to maintain a healthy relationship with viruses in the long term, we need a disease model that is more attuned to the broader ecological embedding of humans and the everyday relationship we have to viruses. Both questions will have to be taken into consideration, even if they invite contrasting answers and thus fail to provide governments and medical institutions with a clear direction for policy.**