

DIY GUIDE TO HEALTH, WELLNESS & WHOLENESS

**Special Issue**

# NEW DAWN

VOL.15 NO.2

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On the Cutting Edge

# Distressed Microbiomes & the Health Crisis

– BY ADAM J. BODAY –

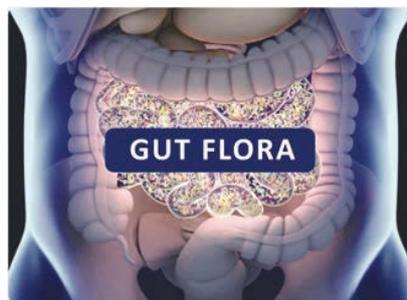
**H**umankind is a diverse species. We can thrive and survive in all parts of Planet Earth by maintaining our most important physical functions – self-preservation and procreation.

Our ability to adapt manifests on different levels. In physiology, we maintain a stable body temperature using metabolism, regulated by thermostatic control, with the thyroid gland playing a key role. We use artificial coverings to protect our bodies, such as clothing, and invented technical solutions such as buildings and air conditioning to sustain thermal balance.

The diverse ecosystems of Mother Earth provide a more or less ample source of nutrients for all living creatures. The microbes that sparked life on the planet serve as the basic link between organic life and the inorganic environment.

In this short essay, I discuss aspects of nutrition, metabolism, digestion and secretion in relation to the human microbial ecosystem – the microbiome.

The cycle of life is a complex system – growth, life processes, reproduction and the end-of-life breakdown of all living creatures, which in turn provide the raw material for new organisms. The energy from sunlight stimulates all living processes. Our digestion is a series of complex biological processes involving the transformation of diverse organic compounds. These natural processes have functioned due to the self-sustaining chemical, physical and biological laws that



manifested after life first appeared on our planet some three and a half billion years ago.

We are no exception to any of this, neither below nor above the primordial laws of life, although we tend to think of ourselves as detached from our environment. Our selfish, greedy and short-sighted views often place us, and our needs, above and at odds with the laws of nature.

In this atomic age, humanity pursues lifestyles based on unending economic growth (driven by the anthropogenic dogma of abstract money) and limitless consumption. Our faith in technical development and all its innovations has made this lifestyle a sort of global religion.

The goals of science include the unravelling of the mysteries of human life and the search for a unified theory of the physical universe. Scientific methods have become limited to isolated, single variable tests that can be proven with experiments reproducible under laboratory conditions. This process has caused extraordinary specialisation in various fields.

## HUMAN GENOME PROJECT

At the end of the 20th century, scientists set the ambitious goal of deciphering the human genetic code in the hope they could use “advanced genetic engineering” to cure and prevent all diseases. The initiative was named the Human Genome Project. Blind faith in technical advancement and the profit-making capacity of the health industry drove governments and corporations in a race to map the human genome (the genetic information stored in the nucleus of each of our cells, which was thought at that time to be the pattern of proteins that run bodily biological processes). They predicted that once the mapping was complete, new genetic engineering techniques would be patented and marketed so all could be granted full physical and mental health – for a price.

The Human Genome Project ended faster and more efficiently than expected. The project to map and sequence unknown genetic areas produced the following results: There are some 3 billion codes of base pairs in the 23 human chromosome pairs. Previous estimates sought to identify at least 100,000 protein-coding sequences during the project. However, there were only 23,000 protein-coding sequences identified on the genetic map, which is *not more than 3%* of the total genetic data of our DNA. Apart from the promoters, terminators and protein-coding sequences, *scientists considered the remaining 97% to be evolutionary waste.*

Conclusions drawn from facts known to science harden to become

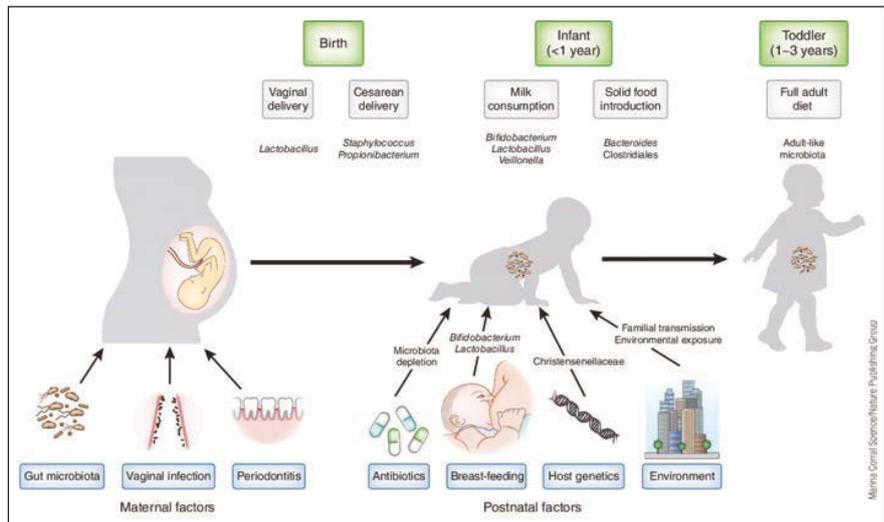
dogma. In this case, the 'unknown' section of the code - up to 97% - was 'de-canonised' and labelled "junk DNA." Residue, error, waste.

**DISCOVERING THE MICROBIOME**

In recent years that dogma has been challenged, and researchers analysing so-called junk DNA have discovered the critical roles of the human body's microbial inhabitants. In the field of digestion, the microbiome has come into focus over the past decade. Researchers have found multiple correlations that shed new light on this virtually neglected ecosystem known until now as intestinal flora, together with its functioning and effects on human health.

Modern genetic mapping opens the door to this extraordinary ecosystem of microbes. Our initial peek into these ignored 'invisible' biomes has startled many into a realisation of the perfection of life and the astounding complexity of biological systems. According to some estimates, there are about 30 million species of microorganisms on Earth, with a few thousand species constituting our human intestinal microbiome. Only a few hundred (200-600) microbial species form a biome at a given point in time, under certain circumstances, and each unique to our individual bodies like our fingerprints. The correspondences of these individually varying biomes and our metabolism, however, is the same in that they connect us with the outside world, and our digestive system relies on them to adapt to the variety of foodstuffs we take in.

Our alimentary canal - the organ stretching from the mouth to the anus - hosts a score of symbiotic microorganisms. These microbes enter the one-way alimentary canal from our environment with the food and water we consume. The fauna of our respiratory organ hosts a multitude of airborne microbial strains, and they are similarly present on other body surfaces - hair and skin - in contact with air. These organisms, invisible to the naked eye, form biosystems - closely integrated communities - in various parts of our body. Like diverse habitats on the planet, they create unique environments. A variety



▲ Factors shaping the neonatal microbiome. Postnatal factors such as antibiotic use, diet, infant genetics and environmental exposure, further configure the microbiome during early life. As diet diversifies with age, the microbiome gradually shifts toward an adult-like configuration, which is usually reached by age three. Bacteria associated with the different processes are indicated. (Source: [www.semanticscholar.org/paper/The-microbiome-in-early-life%3A-implications-for-Tamburini-Shen/6e5eeacdb62051f74973382078f75b9e48ddf6af/figure/0](http://www.semanticscholar.org/paper/The-microbiome-in-early-life%3A-implications-for-Tamburini-Shen/6e5eeacdb62051f74973382078f75b9e48ddf6af/figure/0))

*Our initial peek into these ignored 'invisible' biomes has startled many into a realisation of the perfection of life and the astounding complexity of biological systems.*

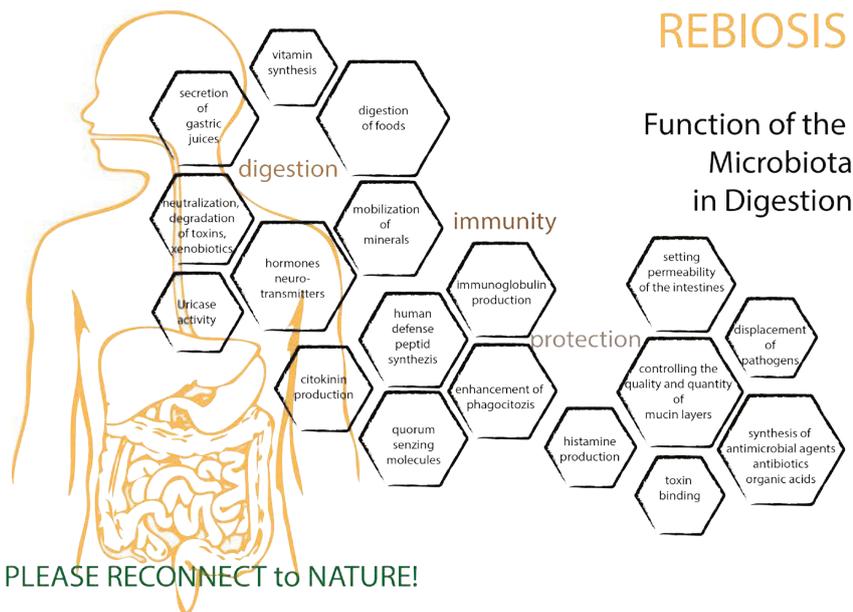
of colourful associations of these organisms adapt to the different surroundings. Think of lush tropical jungles, the variety of life around coral reefs, and even the distinctive biomes of sand and ice deserts.

By using simple arithmetic, we can estimate the number of microbes in our body because we know that our intestinal content weighs 1.5-2 kilograms on average, containing up to several billion microbes per gram. Therefore, when you think of the microbiome, you should imagine as many as an almost astronomical few 100 thousand billion.

Microbes are believed to have several thousand species in which hundreds of concurrent microorganisms form an ecosystem in our intestinal canal. Genetically speaking, microbes carry at least a thousand times more DNA information than the 3 billion base pairs of the human genome. These microbes contribute to the coding of some of the unmapped 80,000 proteins that provide the biological functions 'missing' from the human genome, and use these proteins during their symbiotic life with us.

Parts of the biome - in the symbiosis of micro- and macroscale organisms - maintain the balance between the building and break-down processes in the cycle of life by way of interdependent, mutually beneficial biological systems. Biological systems forming increasingly complex life forms evolved in each habitat using available building blocks. These systems are interdependent. Humanity, together with all other living beings, evolved in this biological system.

All habitats have organisms that break down complex organic structures and chemical compounds residing in the specific environment. All components - leaves, crop, roots, trunk and branches - of an apple tree are broken down in the shared effort of living creatures



**PLEASE RECONNECT to NATURE!**

(macro- and microorganisms) inhabiting and adapted to the ecosystem of the apple tree. These metabolic components are then used to build new life. In this sense, it is not a food pyramid because circular processes have no hierarchy but a harmonic cycle.

*The essence of the metabolic cycle is that life becomes food, and food becomes life.*

The human body hosts a highly complex biome that we may view as a permanent home, a habitat with diverse climatic conditions. The microorganisms living inside and on us adapt to changing conditions a lot faster than we can because a whole new generation of them come to life in only thirty minutes. Species that find favourable conditions (of climate or material turnover) proliferate and begin work within a few hours. We also benefit from those organisms which predigest and digest the food we 'stuff' into our digestive system. Our digestive system transforms food from various habitats into nutrients. No matter what we eat, the composition of our intestinal microbiome adapts at amazing speed. Generations of microbes accumulate, doubling their numbers every thirty minutes, and ferment nutrients we otherwise could not digest due to the deficiencies of our genetic composition.

This system works flawlessly as long as we maintain an organic, natural, moderate and diverse diet.

In this sense, natural means a complex diet of seasonal and organic produce that guarantees good microbial communities. We digest macronutrients to provide the vast majority of our material turnover; the adaptability of our symbiotic microbiome supplies us with the micronutrients to make our metabolism function to full capacity. Ambient microbes help us adapt to different environmental conditions, which is why humans can settle in the majority of land habitats.

### **WHAT'S CAUSING DISTRESSED MICROBIOMES & ASSOCIATED HEALTH PROBLEMS?**

In our modern world, blind faith in economic development has detached human communities from natural processes. The population of Earth nears 8 billion. Although the planet could feed some 16 billion people, the highly disproportionate distribution of agricultural production leaves over 2 billion people starving. Overconsumption and waste in the developed world, with its mechanised agricultural and food industry boosted by high-efficiency chemical industry substances, only serve commercial interests.

Unfortunately, this global system that generates increasing consumption disregards natural physiological conditions. Natural meals and drinking water have been transformed from local and seasonal foodstuffs with complex nutrients

into commodities that are easy to transport and store to generate profits.

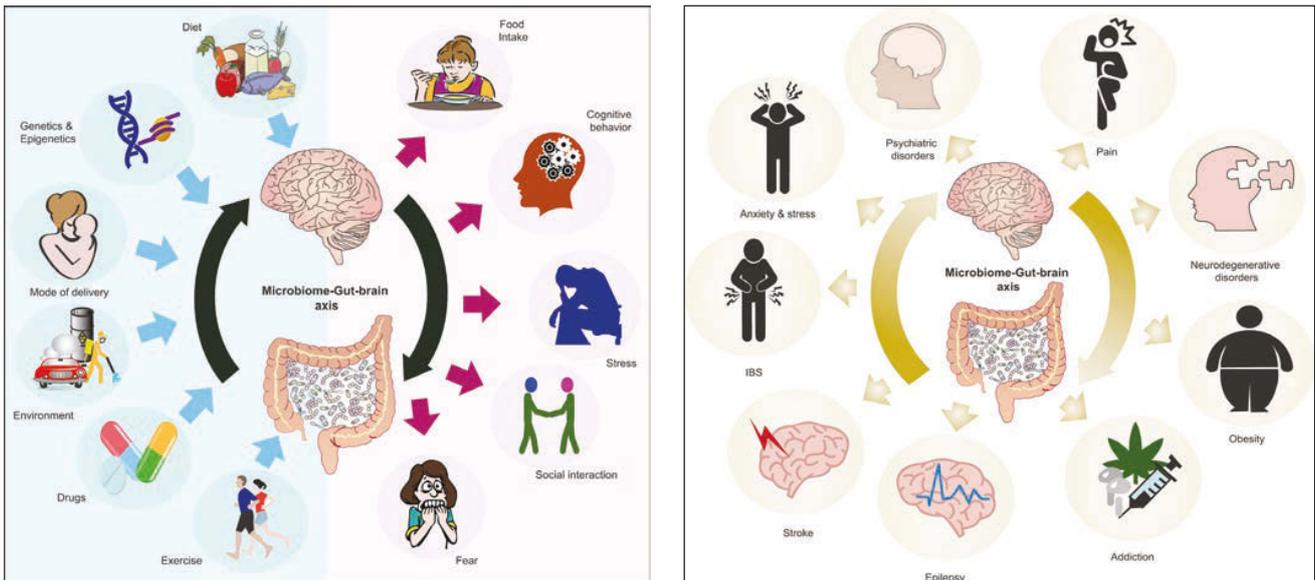
Water treatment and agrochemistry has significantly changed natural microbiomes and severely reduced their diversity. This poses the risk of depletion and contamination of natural resources (soil life) for coming generations. Intensive (agro)chemicalisation makes food easy to store and look attractive on the shelves, but such food does not contain naturally existing microbial communities required for healthy human digestion.

Gastrointestinal disorders have become endemic in developed societies causing health problems for more than half the population. Our digestion is severely compromised from poor water and food that fails to supply our digestive tract with the microbial communities it needs. One-third of the population in developed countries suffer from obesity and many metabolic and autoimmune diseases. Scientific research has identified a correlation between these health impairments and the distressed microbiome.

This is not surprising since modern food production strips many complex nutrients from whole foods, turning them into tasty but nutritionally empty products - commodities - with a microbial content close to sterile. This disrupts the continuous resupply of our microbiome, and we develop a deficit of complex micronutrients from natural foods.

Resistant microbial strains adapted to chemicals, preservatives and drugs in our digestive system have taken over the habitat once populated by a diverse natural gut microbiome, leading to all types of disorders. These disorders cause inflammation, leaky gut syndrome, chronic bowel problems and distension, preventing the critical functioning of our largest endocrine (hormone-secreting) organ.

The digestive system processes and absorbs nutrients poorly. Consequently, we experience functional malnutrition and devour more and more refined food products to sate our permanent appetite. We consume foods beyond our biological needs. Our bowels are permanently full and do not have time to regen-



▲ **Left:** Factors known to impinge on microbiota-gut-brain activity, and various behaviours known to be affected by microbiota-gut-brain axis perturbation. **Right:** Microbiota are implicated in a variety of diseases and disease processes.

erate when they are not forced to digest the overconsumed volume in the resting period, which in turn increases the number of problems. A dysfunctional digestive system deprived of functional nutrients is prevented from fulfilling its vital functions.

Treated drinking water and sterilised food products considerably reduce the responsiveness of our immune system because they do not contain key natural microbial stimuli that a diet encouraging healthy microbes would keep permanently alert. In many cases, the aromas, flavour enhancers and artificial additives mask the stimuli that our digestive system would normally recognise to easily fend off malicious external intruders.

In summary, instead of enjoying the complexity of natural food, the modern world has turned to processed foodstuffs, refined ingredients and micronutrients, and dietary supplements produced on an industrial scale, along with microbes bred in sterile laboratory conditions.

Unfortunately, the big problem is that microbial communities, which are about 100,000 times more adaptive than humans, are adapting to the industrial products they are exposed to. We are hosting microbial strains resistant to antibiotics, preservatives, agrochemicals and

food industry agents instead of a natural and diverse microbiome that evolved parallel with 200,000 years of evolution to support our inherent desire for a long and healthy life.

Around ten scientific studies are published every week on the correlation between the microbiome and various chronic noncommunicable diseases (NCDs). It is still not too late. We can stop this self-destructing process and regain the natural resistance and regenerative ability of our body by maintaining a moderate diet of seasonal, local food of natural origin, and drinking water from microbiologically safe, but natural sources.

We are lucky in that many of us can still obtain firsthand information from our grandparents. We can learn traditional food cultivation methods and rediscover unmodified natural varieties of living organisms to nurture ourselves and future generations. We have a responsibil-

ity to future generations, so they learn from our mistakes to be better – and healthier – than us.

It is clear that healthy digestion and all its key functions (breakdown of food, absorption of nutrients, boosting immunity and balanced secretion of hormones) require naturally complex (unprocessed) food. Clean natural water supports this one-way digestive process through complex composition and natural microbial communities. All this ensures the adaptability of the microbiome to efficiently digest available food.

For the sake of future generations, we need to provide our children with natural food and teach them to make moderate, healthy choices. Naturally derived nutrients instead of commodities refined through elaborate processes and offered simply for excessive consumption and profit.



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