

With current technology available for synthetic nitrogen production, humans may amplify this process and distribute nitrogen on a global scale (11). In turn, though most oxygen sources would vanish in the disappearance of photosynthetic cyanobacteria, plants and algae are estimated to provide atmospheric oxygen up to 50% (10, 12). Photosynthesis continues and, therefore, without prokaryotes humans would still be able to breathe.

Moreover, humans can also solve the challenges involved in supplying food in order to survive. For example, through our advancements in food technology, we can now make synthetic meat using cow stem cells (13). Vitamins, antioxidants and other building elements for artificial foods can now be synthesized using nanotechnology (14). Other nutritional compounds can also be made, potentially through recombinant biotechnology with yeast as a surrogate host on a more extensive scale (10). Hence, with proper implementation of technologies, humans have the capacity to provide solutions and survive life without microbes.

Humans – better with microbes

Although human life can exist in the absence of microbes, global recycling of elements necessary for the continuation of life would eventually cease (10). Though we may be able to supply nitrate for plant growth, allowing for agricultural food production to proceed in a microbe free world, without the ability to recycle the nitrogen, significant amounts would no longer be regenerated – largely remaining stagnant as buildup on the ocean floor (10). Secondly, as a consequence of continuing animal respiration and human fossil fuel use, CO₂ levels in the atmosphere would inevitably increase, leading to global warming through the greenhouse effect (10). Thus, without microbes driving the regeneration of essential elements, such as nitrogen and carbon, via global biogeochemical cycles, our oceans and soils would become unproductive (10, 15). Of note, phosphorus in the ocean would begin to sequester to sediments and negatively impact marine primary production (10). Although we may be able to solve this issue using emerging technology, a limited supply of phosphorus mines makes the sustainability of this system improbable (10). Thus, we must appreciate the microbial processes that maintain the global biogeochemical cycles and how microbes make it significantly easier for us to survive.