When we go about our daily lives, we are constantly surrounded by invisible clouds of molecules and microscopic organisms [1]. Microorganisms affect the macroscopic world that we are familiar with in myriad and sometimes unexpected ways. For example, metabolic processes inside ocean-dwelling bacteria can result in the release of gasses that are crucial for cloud-formation [2]. However, our descriptions of the weather do typically not incorporate bacteria, illustrating the notion that we can have an understanding of phenomena without taking into account all of the events they emerge from. Generally, there are no formal guidelines on the appropriate level of abstraction for the description of a system or process.

This can be further illustrated by looking more closely at the "simple" bacterium mentioned above. This organism lives in an ecosystem from which it receives and to which it provides nutrients. Inside a given bacteria, we can imagine metabolic pathways in which biomolecules are transformed via chemical reactions. Metabolites are often envisioned as tiny balls, jiggling randomly around the cell until they bounce into slightly larger balls that represent the enzymes that transform them. Enzymes themselves are wigly macromolecules (proteins) and their chemical composition and structure is crucial for their function.

Much of modern biological research followed a reductionist approach aimed at identifying and characterizing the various molecules inside cells to increase our understanding of organisms. However, biological systems are highly regulated and the cellular environment can feed back on and constrain the function if its constituents [3]. Thus, a system can be more, but in some sense also less, than the sum of its parts. More recently, approaches of studying biological entities in a more holistic manner have reemerged resulting in a field referred to as "systems biology". Systems biological description typically rely on mathematical models and are thus necessarily abstracted and idealized [4]. Despite nature's vast complexity, such descriptions may give us a grasp of the principles that govern life on earth. However, finding the right level of abstraction largely relies on our intuitions and thus whether current attempts of a systems view on organisms will be successful, remains to be seen.

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[3] Hofmeyr, J. H. S. (2017). Exploring the metabolic marketplace through the lens of systems biology. In *Philosophy of Systems Biology.*
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