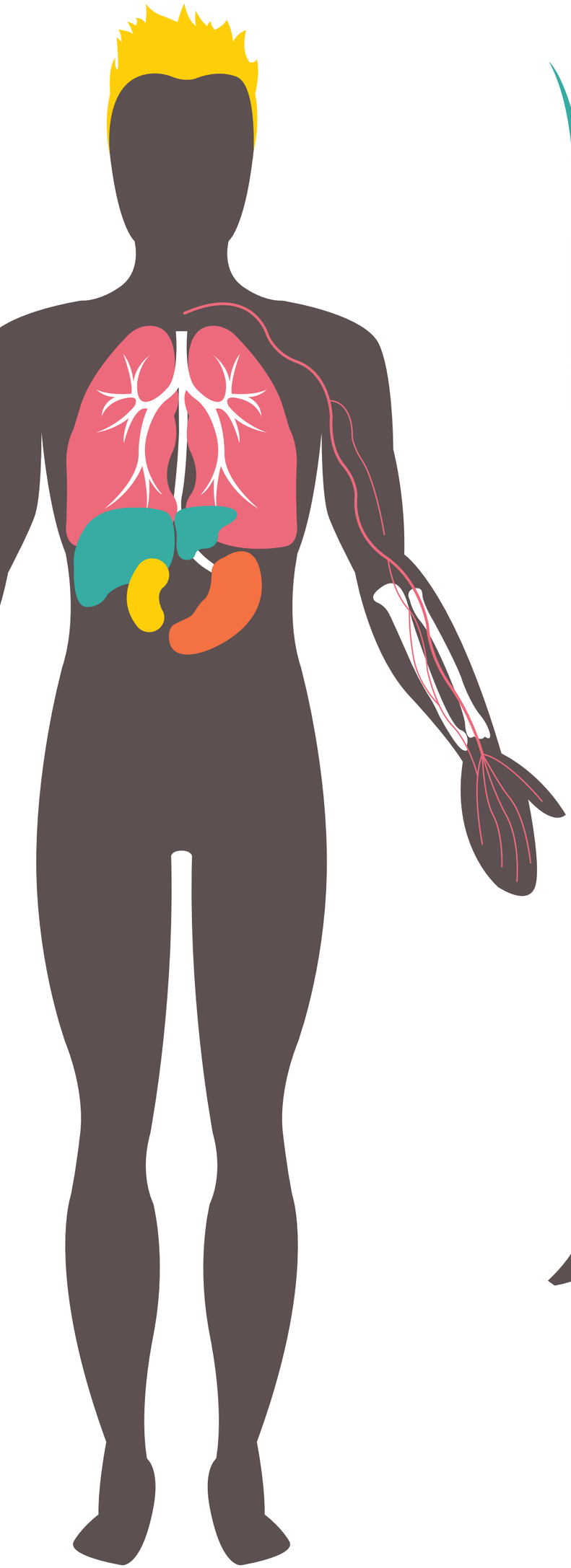

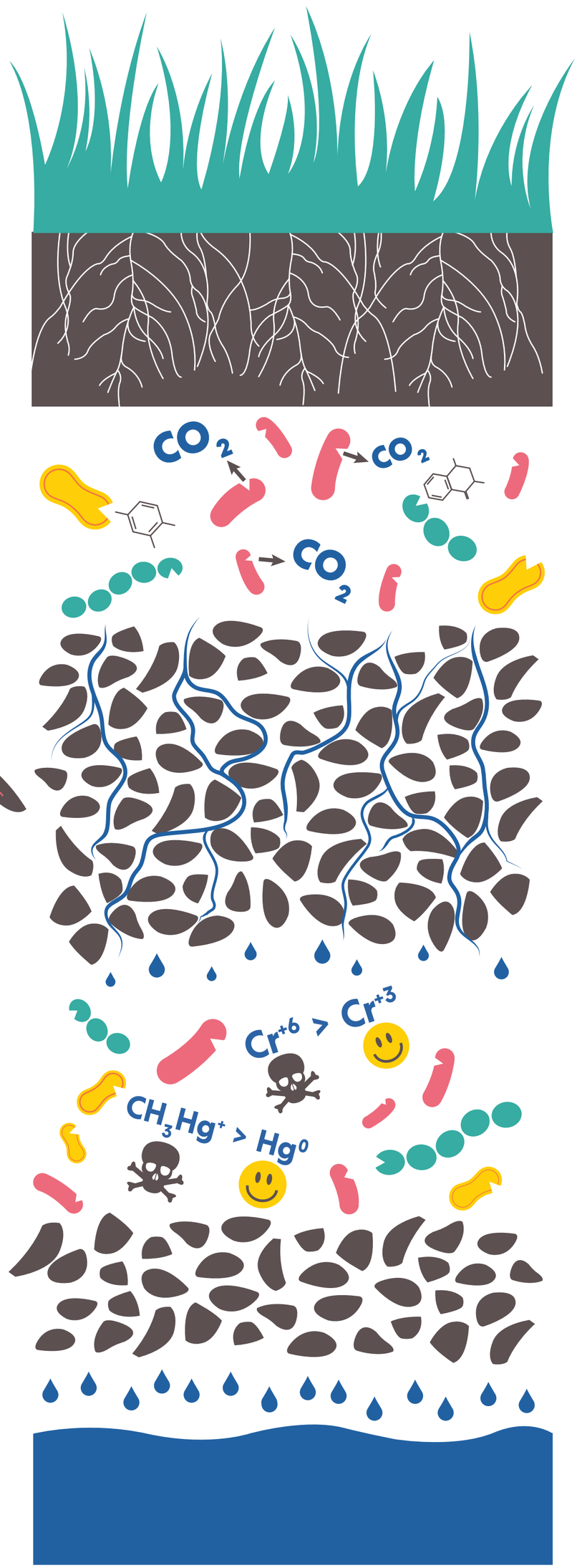


# soil: the superorganism

just like our organs provide essential functions that keep us healthy, soil provides a host of ecosystem services that make for a healthy environment!

**protection -- "the skin and the hair"**
soil is often considered the excited skin of the earth: a thin layer upon which life hinges. just like hair provides protection for our skin, vegetative cover, or plants, provide protection for the soil, holding it in place and keeping it from blowing away.

**metabolism & respiration – "the stomach and the lungs"**
soils are alive!! just like us, soil microbes eat and breathe! as they decompose plant and animal waste, they convert carbon and other nutrients into biomass and energy. oxygen in, CO2 out. if we feed them with roots and residues, soils can store carbon from the atmosphere, but if we starve and disturb them, soils can be a source of greenhouse gases.

**physical structure – "the bones"**
microbes are the architects of the soil. together with plant roots and other organisms, they clump mineral and organic materials together to form aggregates, providing structural support and habitat for soil organisms. activities like tillage can destroy structure, leaving microbes living in a collapsed house!

**circulation – "the life blood of soil"**
just like blood courses through our circulatory system delivering nutrients and oxygen to every cell in the body, water flows through the pores and channels of the soil delivering nutrients and oxygen to plant roots and microbes. good structure provides connectivity between pores, while poor structure, like a clogged artery, limits the delivery of water, air, and nutrients to plants and microbes alike.

**biodegradation – "the liver"**
what we consider a pollutant is often considered food to a microbe. these 'waste managers' of the soil are able to transform heavy metals and organic contaminants into much safer byproducts. just like the liver, however, we can overtax the system leaving microbes unable to break things down completely and allowing contaminants to leach to the groundwater.

**filtration – "the kidneys"**
just like the carbon filter in your brita or your air purifier, healthy soils are full of carbon-rich organic matter that holds on to contaminants, physically preventing them from leaching downward into the water table. clay sized particles also contribute. they carry a negative electrical charge and are able to bind up contaminants, removing them from the soil solution and protecting our groundwater!