

# The Omnipresence of Chemistry

The word “chemistry” evokes different reactions in different people. To some, it may bring to mind memories of a class taken in high school; to others, it may translate into the perfect pairing of two beautifully matched personalities. It is more than merely a science – it is an idea, a concept that is capable of adapting more than one appearance. Chemistry is truly a wondrous thing, and its presence in the world is universally detectable. Through the media of technology, everyday life and self-discovery, it presents itself to the world in a way that reveals its intrinsic beauty, complexity and practicality. Indeed, it is the discipline of chemistry that provides the vital infrastructure on which the world is built.

One is able to observe chemistry in its purest form through the implementation of new technologies. In a world in which the supply of energy sources is quickly becoming depleted, concerned scientists look to new, different alternatives that are renewable and are therefore less harmful to the Earth. An example of such a technology is bioenergy, which is derived from the chemical potential energy stored in organic matter. Although our primitive ancestors did not have to use the principles of chemistry to look for alternative energy sources, however, the principles of chemical reactions have been used to solve problems nearly all throughout history. Simple metallurgical processes that make use of chemical reactions, such as the manufacture of alloys, have allowed human beings to use more refined tools to complete tasks more efficiently. Taking another historical step backwards from that point leads one to the use of fire to perform the most basic of tasks. The mechanics of the world are predominantly improved upon and fueled by chemical reactions; in essence, chemistry is “what makes the world go ‘round’”.

Basic technologies such as fire may have been sufficient for our ancestors; however, more efficient, accessible and developed tools are more likely to be used in the modern world. Seemingly axiomatic, simple things such as washing clothes actually involve complex chemistry; water is mixed with detergent to loosen the particles of dirt and oil that become ingrained in clothing. Similarly, water is unable to effectively remove grease from a dirty plate, but the simultaneously-polar-and-nonpolar quality of dish soap allows it to dissolve and wash away the grease from the plate. Even cooking a dish requires the application of heat to modify the chemical structure of the raw food and convert it into something with a different flavor. These applications of chemistry are, so to speak, “hidden in plain sight”; they are extremely prevalent in – and are essential components of – daily life, but are surprisingly unnoticed and appallingly underappreciated.

Another relatively unrecognized site of chemistry is the human body. The most basic unit of life, the cell, is a station in which deoxyribonucleic acid, or DNA, is synthesized by a chemical reaction. DNA, of course, is the basic structure upon which all life is built; in the same way that DNA composition can vary from person to person,

personality comprises a wide spectrum of thoughts, feelings and reactions. All human emotion (and, by extension, all human behavior) is essentially controlled by the release of chemicals such as dopamine and serotonin. These two chemicals go hand-in-hand with the chemicals that control physiology to form an integral part of the human experience. Hormones are molecules that, when attached to receptors, cause cells to perform certain functions (such as producing proteins). Without these chemical signals to tell our bodies which tasks to perform at what time, human beings would almost certainly be rendered incapacitated. Chemistry, in conclusion, is an extremely vital component of human life; as such, it can be found in many different forms within the human body.

In sum, the inherent beauty of chemistry is directly related to its permanent presence in the world around us; a few of its applications include the development of technology to perform tasks more efficiently, the basic tasks needed to maintain a proper, healthy lifestyle and the cardinal functions of life. Because it is so prevalent in our lives, new developments in the field of chemistry may have staggering impacts on the human population. A new, more efficient way of producing energy may drastically reduce the magnitude of negative effects on the environment (or even eradicate them altogether); a quicker way of cooking food may decrease the amount of money spent on energy (and, subsequently, the cost of living); a synthetically engineered hormone may be able to cure a disease at a fraction of the cost of normal treatment, saving the lives of millions. The delicate balance of life on Earth relies on perfect combinations of chemical reactions that occur among both living and non-living things; the implications of even tiny deviations from the norm may be astronomically disastrous or vastly wonderful. The perpetual nature of chemistry in the world around us is fascinating; one will inevitably be able to find it by stopping to allow airborne molecules from a rose to react with one's olfactory receptors.