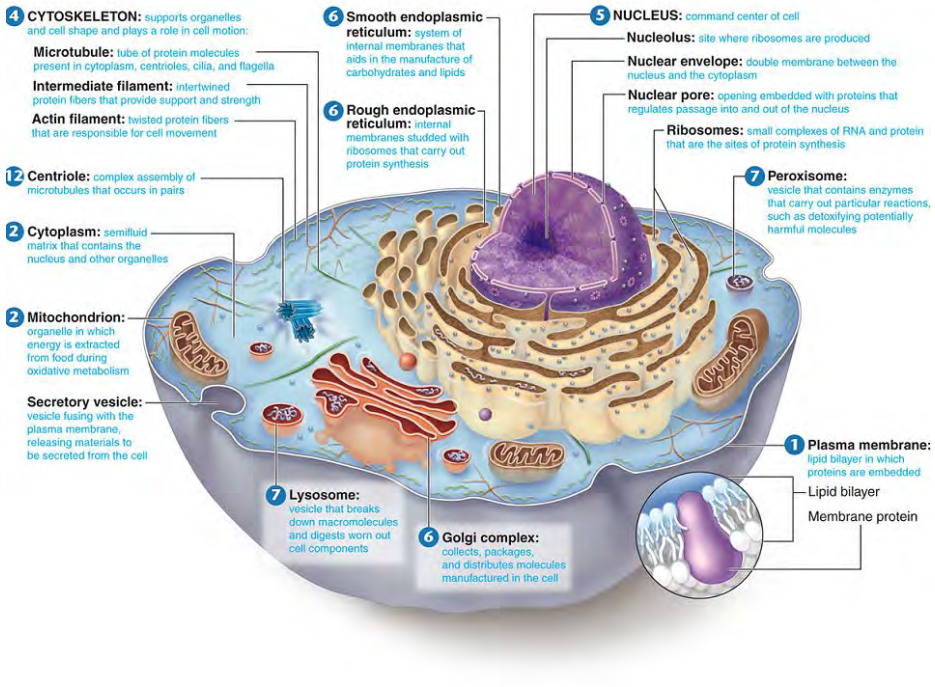
The Science Behind the Magic of Essential Oils

by Jaime Wieland

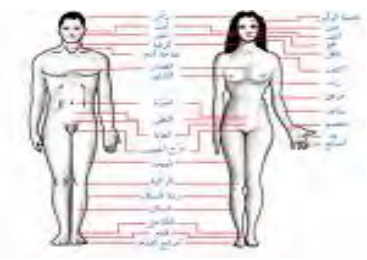
Most claim there isn't scientific research to support the "magical" properties of essential oils. I'm convinced after reading this, you will see otherwise.

To begin to understand how essential oils are beneficial, one must first begin by exploring the anatomy of the human body. Our bodies, like any other living organism is comprised of cells. A cell is the smallest unit of life that is classified as a living thing. On average, the human body is comprised of about 10 trillion cells! Each one of these cells has a membrane called the plasma membrane. It separates the interior of the cell from the outside environment. It consists of a lipid bilayer that is semipermeable, allowing the passage of certain, especially small, non-polar molecules such as lipids, alcohols and esthers to enter but acting as a barrier to others such as bacteria, viruses and fungi in order to protect the many structures inside of the cell. These structures include but are not limited to hundreds of highly specialized enzymes that carry out extremely specific tasks that the cell needs to live its life. The instructions for these tasks come from the cell's DNA. As long as a cell's membrane is intact and it is making all of the enzymes it needs to function properly, the cell is alive.



Each structure within the cell has it's own function. These functions include taking in nutrients from food, converting those nutrients into energy, carrying out specialized functions, providing structure for the body, reproduction, etc. All this is possible by the

usage of oxygen. Our bodies turn the oxygen from the food we ingest into energy called ATP (Adenosine Triphosphate). This is done continually since the cell doesn't have a storage space for energy. That is why on average, 200 million of the body's cells die every minute! Below is what some medical doctors and researchers have even been able to put together in a "Body Regeneration Schedule" of how long it takes certain cells to reproduce themselves:



Men and Women have the Same Regeneration Schedule
Schedule - Published by Medical Doctors and Researchers
120 Days - NEW Red Blood Cells
90 Days - NEW Skeleton
60 Days - NEW Brain Cells, Tissue
49 Days - NEW Bladder
45 Days - NEW Liver - NEW DNA Cell Material
30 Days - NEW Hair - NEW Skin
5 Days - NEW Stomach Lining

When we consume an excessive amount of fats rather than natural healthy foods , disease becomes common due to an overload of oxidative stress reactions. This reaction is a result from the metabolic reactions that use oxygen, and has been defined by the department of biochemistry and biophysics at Iowa State University as a disturbance in the equilibrium status of pro-oxidant/anti-oxidant systems in intact cells. This potentially produces oxidative damage to lipids, proteins, carbohydrates, and nucleic acids, ultimately leading to cell death. This is one of the reasons that there is such a high importance as to what we put on and in our bodies. Cells use what we give them to produce new cells, hence "you are what you eat!" A healthy cell produces healthy new cells.

Now let's look at essential oils. Although only 200 essential oils have been studied at present, approximately 3000 essential oils are known! These oils are so very, very small that is has been estimated that there are 40 million trillion molecules in one drop of essential oil! That is 40,000 molecules for each cell in the human body! They are smaller than human cells and are made of lipids, esthers and alcohols enabling them to penetrate our body's cell wall without killing the entire cell.

Essential oils are volatile or substances that are easily dissolved at normal temperatures, that are distilled from different parts of plants such as seeds, bark, leaves, stems, roots, flowers fruit. etc. They have many functions in nature such as attracting pollinators and dispersal agents, releasing chemicals to prevent competing vegetation from growing within its area or zone called allelopathy, to serve as defense compounds against insects and other animals and finally to protect the plant with their antifungal, antiviral, and antibacterial properties. These properties are unique to each oil. There are 800 possible chemical constituents in essential oils! It is these major components that determine the biological properties of the essential oils. For example, some essential oils play a significant protective role in removing damaged cells because of their prooxidant properties! This is

particularly important because illness and disease cannot exist in an oxygen rich environment. For our intent purposes, we will simplify these into two distinct groups: the hydrocarbons:

Hydrocarbons/Terpenes	Chemical Constituents (Terpenes can have antifungal, antiviral, antihistaminic, antirheumatic, antitumor, antiblastic, anticarcinogenic, hypotensive, insecticidal, purgative, and pheromonal properties!)
Monoterpenes (occur in practically all essential oils)	inhibit the accumulation of toxins, help discharge existing toxins from the liver and kidneys, antiseptic, antibacterial, stimulating, analgesic and expectorant
Sesquiterpenes (Research from the universities of Berlin and Vienna show that sesquiterpenes increase oxygenation around the pineal and pituitary glands and have the ability to suprass the blood-brain barrier allowing the oil to enter the brain tissue!)	antibacterial, anti-inflammatory, antiseptic, hypotensive, analgesic antispasmodic, soothing, calming and sedative

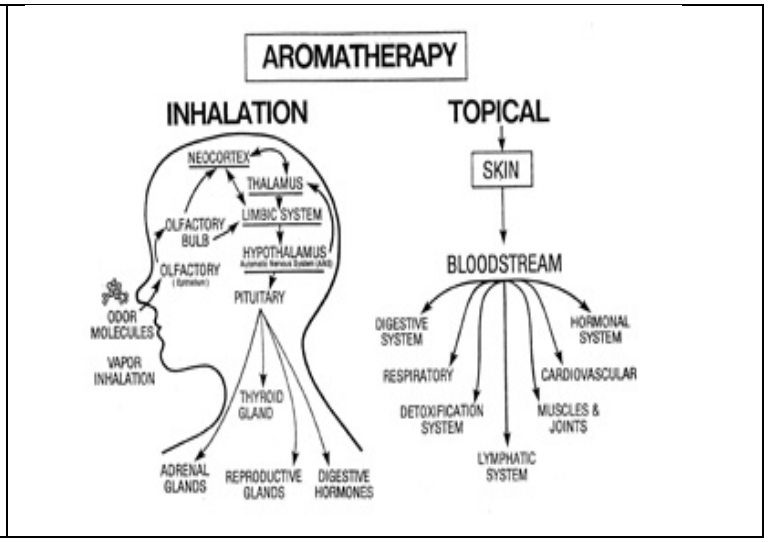
and the oxygenated compounds:

Esters	free of toxicity and irritants, antifungal, antispasmodic, balancing or regulatory, calming, relaxing and balancing
Aldehydes	anti-infectious, anti-inflammatory, calming, fever-reducing, hypotensive, tonic, antiseptic, antimicrobial, antifungal, and vasodilating
Keytones	can stimulate cell regeneration, promote the formation of tissue, and liquefy mucous
Alcohols	commonly antibacterial, anti-infectious, anti-viral, and stimulating. also been known to help increase blood circulation and resist oxidation!
Phenols	some of the most powerful antibacterial, anti-infectious, and antiseptic constituents! They also have antioxidant properties, are very stimulating to the nervous and immune systems, and have high levels of oxygenating molecules
Oxides	anti-inflammatory, expectorants and mildly stimulating

These chemical constituents can all be easily altered according to where the plants were grown, the climate when the plants were growing, the part of the plant in which the oil was distilled, harvest season and method, organic or chemical fertilizer, and the process in which the oils were extracted from the plant. There are many different methods to extracting the oils. This is a critical part in determining the therapeutic and medicinal qualities of the oils. Extraction methods include steam distillation, hydro-diffusion, solvent extraction, CO^2 extraction, cold pressing or expression, and enfleurage. Chemical constituents can be easily destroyed in any of the processes mentioned above because of high distilling temperatures and pressures as well as the presence of chemically reactive metals. Unless you can continually monitor all of these things to always be exact at all times, the chemical constituents of the oils will always change. This change however, is the reason that our body's are unable to grow any tolerance to the oils!

We can inhale, ingest or topically apply the essential oils. The different applications provoke differences in absorption. Studies from www.pubmed.com reveal absorption reactions through inhalation after 20 seconds while topical application took 20 minutes! The key to enabling our body's to be able to use the essential oils is through a system of the human body called the limbic system. This is where our memories, instincts, and vital functions are controlled and processed. Functions such as digestive activity, respiration,

hormone balance, blood pressure, stress levels, heart rate, & pain reduction can be regulated here. Below are some illustrations to demonstrate the route the essential oils need to travel according to their application process. Although some essential oils are safe to ingest in small quantities, it is not suggested due to possible high toxicity levels and/or possible secondary carcinogens of some constituents. Therefore, it is best not to self diagnose ingestion of the oils.



Of all of our senses, the sense of smell offers us more than 10,000 times more information than all the other senses combined and is our only sense that can bypass our cerebral cortex and travel directly to our limbic system! They then travel to the hypothalamus which in turn determines where to send the oil such as to the pituitary, pineal and amygdale parts of the body. Finally this stimulates the autonomic nervous system, endocrine system, organ function, antibody secretions, neurotransmitters, hormones and enzymes through the body in a matter of minutes!

Essential oils are continually surprising the medical field, from stimulating the limbic, integumentary, lymphatic, and stress physiology to helping rebuild and sustain healthy cells. The research behind them is growing everyday but it doesn't take a scientist to see the positive effects they have on our entire beings when used correctly!

Anatomy & Physiology, Seeley, Stephens, Tate. 7th edition

Modern Essentials, Aromatools, 4th edition

Clinical Aromatherapy Level 1, Aroma Apothecary

http://dictionary.reference.com/browse/homeostasis

www.thefreedictionary.com

http://www.agedefyingbody.com/RegenerationSchedule.html

http://www.moleculardevices.com/Applications/Cellular-Function.html

http://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=2937

http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20lectures/Viruses/viruses.htm

http://www.austincc.edu/rlewis3/lipid_bilayer/model.html

http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20lectures/Viruses/viruses.htm

http://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=1&ContentID=2937

http://www.wisegeek.org/what-is-the-average-cell-life-span.htm

http://www.naha.org/explore-aromatherapy/about-aromatherapy/what-are-essential-oils/

http://www.reinventinghealthcareinfo.com/wp-content/uploads/2012/05/Dr.-Winterton-Biological-Effects-of-Essential-Oils.pdf

http://community.tncc.edu/faculty/zahn/mypage/cell_respiration.htm

www.holisticdad.net

http://www.bb.iastate.edu/~jat/glutchp.html