

# THE BLOOD-BRAIN BARRIER

By David Stewart, PhD, RA

It was thought for years that the interstitial tissues of the brain served as a barrier to keep damaging substances from reaching the neurons of the brain and the cerebrospinal fluid. Instead of a barrier, it would be more accurate to consider it as a sieve or filter through which only molecules of a certain size or smaller can pass.

Most of the molecules of the substances used in chemotherapy are too large to pass through the blood-brain filter, which is why doctors say that chemotherapy doesn't work on brain cancer. Some of the smaller molecules get through, but not the whole suite of drugs intended.

Doctors don't know for sure, but it seems that in order to cross the blood-brain barrier, only molecules less than 800-1000 atomic mass units (amu) in molecular weight can get through. Lipid solubility seems to be another factor which facilitates passing through the blood-brain barrier. Water soluble molecules don't usually penetrate into brain tissue, even when very small. The molecules of essential oils are all not only small, but lipid soluble as well.

In fact, when it comes to essential oils, small molecules (less than 500 amu) are what they are made of. That is why they are aromatic. The only way for something to be aromatic is for the molecules to be so small that they readily leap into the air so they can enter our noses and be detected as odor and smell.

That is why oils for cooking or massage, such as corn, peanut, sesame seed, safflower, walnut, almond, canola, olive and other oils pressed from seeds are not aromatic. Sure, they have a smell, but you can't smell them across the room in minutes as one can when you open a bottle of peppermint, hyssop, or cinnamon oil. Essential oils of every species cross the blood-brain barrier.

This makes them uniquely able to address disease, not only from a physical level, but from a more basic and fundamental level-that of the emotions which are often the root cause of physical illness.

## A QUICK COURSE IN CHEMISTRY

Because of the tiny molecular structure of the components of an essential oil, they are extremely concentrated. One drop contains approximately 40 million-trillion molecules. Numerically that is a 4 with 19 zeros after it: 40,000,000,000,000,000,000. We have 100 trillion cells in our bodies, and that's a lot. But one drop of essential oil contains enough molecules to cover every cell in our bodies with 40,000 molecules. Considering that it only takes one molecule of the right kind to open a receptor site and communicate with the DNA to alter cellular function, you can see why even inhaling a small amount of oil vapor can have profound effects on the body, brain, and emotions. Sometimes too many oil molecules overload the receptor sites, and they freeze up without responding at all, when a smaller amount would have been just right. This is why we say that when using oils, "sometimes less is better." Sometimes more is better, too. Knowing the difference is the art of aromatherapy.

Essential oils are mixtures of dozens, even hundreds, of constituents, all of which are composed of carbon and hydrogen and sometimes oxygen. All essential oils are principally composed of a class of organic compounds built of "isoprene units."

An isoprene unit is a set of five connected carbon atoms with eight hydrogens attached. Their molecular weight is only 68 amu, which is very small, indeed. Molecules built of isoprene units are all classified as "terpenes." Terpenes are what make essential oils unique in the world of natural substances.

### PHENYLPROPANOIDS

Phenylpropanoids are compounds of carbon-ring molecules incorporating one isoprene unit. They are also called hemiterpenes. There are dozens of varieties of phenylpropanoids.

They are found in Clove (90%), Cassia (80%), Basil (75%), Cinnamon (73%), Oregano (60%), Anise (50%), Peppermint (25%). While they can create conditions where unfriendly viruses and bacteria cannot live, the most important function performed by phenylpropanoids is that they clean the receptor sites on the cells. Without clean receptor sites, cells cannot communicate, and the body malfunctions, resulting in sickness.

### MONOTERPENES

Monoterpenes are compounds of two isoprene units, which is ten carbon atoms and sixteen hydrogen atoms per molecule- molecular weight 136 amu. There are an estimated 2,000 varieties of monoterpenes.

Monoterpenes are found in most essential oils: Galbanum (80%), Angelica (73%), Hyssop ((70%), Rose of Sharon (54%), Peppermint (45%), Juniper (42%), Frankincense (40%), Spruce (38%), Pine (30%), Cypress (28%), and Myrtle (25%).

While offering a variety of healing properties, the most important ability of the monoterpenes is that they can reprogram miswritten information in the cellular memory. With improper coding in the DNA, cells malfunction and diseases result, including lethal ones such as cancer.

### SESQUITERPENES

Sesquiterpenes are compounds of three isoprene units, which is fifteen carbons and twenty-four hydrogens per molecule- molecular weight 204 amu. There are more than 10,000 kinds of sesquiterpenes. Sesquiterpenes are the principal constituents of Cedarwood (98%), Vetiver (97%), Spikenard (93%), Sandalwood (Aloes) 90%, Black Pepper (74%), Patchouli (71%), Myrrh (62%), and Ginger (59%). They are also found in Galbanum, Onycha, and Frankincense (8%).

Sesquiterpene molecules deliver oxygen molecules to cells, like hemoglobin does in the blood. Sesquiterpenes can also erase or deprogram miswritten codes in the DNA. Sesquiterpenes are thought to be especially effective in fighting cancer because the root problem with a cancer cell is that it contains misinformation, and sesquiterpenes can erase that garbled information. At the same time the oxygen carried by sesquiterpene molecules creates an environment where cancer cells can't reproduce. Hence, sesquiterpenes deliver cancer cells a double punch-one that disables their coded misbehavior and a second that stops their growth.

The American Medical Association (AMA) has said that if they could find an agent that would pass the blood-brain barrier, they would be able to find cures for ailments such as Lou Gehrig's disease, multiple sclerosis, Alzheimer's disease, and Parkinson's disease. Such agents already exist and have been available since Biblical times. The agents, of course, are essential oils-particularly those containing the brain oxygenating molecules of sesquiterpenes.

## THE TRIPLE WHAMMY

The big triple punch combination of "PMS" (Phenylpropanoids, Monoterpenes, and Sesquiterpenes) found in essential oils is very powerful in addressing many illnesses, injuries, and disease conditions. That is because this combination offers the following:

First, you clean the receptor sites allowing the proper transfer of hormones, peptides, neurotransmitters, steroids, and other intracellular messengers. (The Phenylpropanoids do that.)

Second, you deprogram or erase the wrong information from cellular memory stored in the DNA. (The Sesquiterpenes take care of that.)

Third, you reprogram the cells with the correct information so they can function properly. (The Monoterpenes do this.)

These three classes of chemical components are why essential oils can sometimes affect a healing that is nearly instant and also permanent. What they simply do is to restore the body back to its natural state of balance and health. While a specific oil may have one or two of these three classes of compounds as its predominant chemistry, all the Biblical oils contain some of all of them. This is one secret to their amazing healing abilities.

So there you have it in a nutshell: The way the blood-brain barrier works and the biochemistry of one of the ways essential oils can help achieve a healing.

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The Center for Aromatherapy Research and Education

Rt. 4, Box 646, Marble Hill, Missouri USA 63764

(573) 238-4846, [care@clas.net](mailto:care@clas.net)

[www.raindropttraining.com](http://www.raindropttraining.com)