

What is Orthomolecular Medicine?

By Charles Gant MD, PhD

In order for me to define **orthomolecular medicine**, a new and rapidly growing subspecialty that I practice, I will first need to define the following important and often misunderstood terms.

- 1) **medicine**
- 2) **science**
- 3) **art**
- 4) **cure**
- 5) **health**
- 6) **doctor**
- 7) **physician**
- 8) **psychology**
- 9) **molecule**
- 10) **molecular biology**
- 11) **ortho**
- 12) **orthomolecular**

You may believe that you know what most of these words mean, but you may be surprised to discover their exact meanings and the historical sources¹ from which these words come. I did not know their exact definitions until I looked them up in the dictionary, and I've practiced medicine for almost 30 years! You'll see what I mean as you read this article, and at the end you'll probably be forced to conclude, as I did, that the US Healthcare System may be in rough shape partly because most of its practitioners don't even know what these simple health-related words mean, words that they use every day to describe what they do.

¹ The science that studies the sources and historical roots of words is called etymology. This is not the same as entomology which is the study of insects!

Several hundred physicians now practice **orthomolecular medicine** in the United States, and several thousand more are now devoting a significant part of their practice to **orthomolecular medicine**. The principles of **orthomolecular medicine** are also being used by physicians who describe their practices using other names, such as *integrative medicine*, *functional medicine*, *complementary/alternative medicine (CAM)*, *alternative medicine*, *holistic medicine* and others.

Let's start off with the first few words on the list above. I practice **medicine** as a medical **doctor**, a licensed **physician** and as a **doctor** who emphasizes **psychology** in my practice. I will define² them first for you so that you can begin to have a better understanding of my work.

med-i-cine (mĕd'ī-sīn) *noun* [from Latin *medicina*] 1. the science and art dealing with the maintenance of health and the prevention, alleviation, or cure of disease 2. the branch of medicine concerned with the non-surgical treatment of disease

² Most of the definitions in this article are derived from three sources:

- 1) The Merriam-Webster's Collegiate Dictionary, Deluxe Edition, 1998
- 2) The American Heritage Dictionary (3rd Edition), 1994
- 3) Taber's Cyclopedic Medical Dictionary, (16th Edition), 1989

Since medicine is both a **science** and an **art**, understanding these terms is also critical to understanding what I do.

sci-ence (sī'en(t)s) *noun* [Middle English, from Middle French, from Latin *scientia*, from *scient-*, *sciens* having knowledge, from present participle of *scire* to know; probably akin to Sanskrit *chyati* he cuts off, Latin *scindere* to split] (14th century) 1. the state of knowing : knowledge as distinguished from ignorance or misunderstanding 2a. a department of systematized knowledge as an object of study <the *science* of biology> 2b. something (as a sport or technique) that may be studied or learned like systematized knowledge <have it down to a science> 3a. knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method 3b. such knowledge or such a system of knowledge concerned with the physical world and its phenomenon : NATURAL SCIENCE 4. a system or method reconciling practical ends with scientific laws <culinary *science*>

art (ärt) *noun* [from Latin *art-*, *ars*] 1. skill acquired by experience, study, or observation 2. an occupation requiring knowledge or skill

Thus **medicine**, the non-surgical prevention, alleviation and **cure** of disease, requires both knowledge (the science) of general truths and laws of science (such as **biology**), and skills (the art) acquired by experience, study and observation of those general scientific truths and laws. Of course this brings up the word **cure**, which means to restore to **health**. Therefore, these critical words must be precisely defined also.

cure (kyûr) [Latin *cura* meaning care] *noun*
1. Course of treatment to restore health 2. Restoration to health

health (hěłth) *noun* 1. A condition in which all functions of the body and mind are normally active 2. The World Health Organization defines health as a state of complete physical, mental, or social well-being and not merely the absence of disease or infirmity.

Now that I've defined medicine, since I practice **medicine** as a medical **doctor**, a licensed **physician** who uses **psychology** (see above), I can now move on to define the terms **doctor**, **physician** and **psychology**.

doc·tor (däk'ter) [from Latin *docēre* meaning to *teach*] 1. one skilled or specializing in the healing arts; especially a physician, surgeon, dentist or veterinarian who is licensed to practice

phy-si-cian (fī-zīsh'ün) [from Old French *fisique* and Middle English *fisicien* meaning *natural*] *noun* 1. a licensed medical doctor

psy·chol·o·gy (sīkol'ejē) [from Greek *psychē*, breath, principle of life, life, soul] 1. the science of mind and behavior 2. the study of mind and behavior in relation to a particular field of knowledge or activity

A physician who is a doctor and who is trained in psychology, practices the art and science of medicine in order to restore health by being a **teacher** (doctor/*docēre*) of the **natural** (physician/*fisicien*), especially as it relates to the mind and behavior (psychology). This is getting close to describing what I do in my medical practice.

Molecules

The science of medicine has advanced rapidly, especially in the last few decades. Some of the **general truths** or **general laws** (see definition of science above) that have been discovered are:

- 1) We are put together with **molecules**
- 2) The underlying mechanism of life itself is driven by pathways of conversion of **molecules** into other **molecules** (molecular reactions)
- 3) Except for minor genetic differences, those **molecular** pathways are pretty much the same in everyone

Each of the roughly 200 trillion cells in your body (cells are made of molecules too) has approximately 50 million molecular reactions per second. That's 200,000,000,000 X 50,000,000 = 10,000,000,000,000,000 (10 "hexillion") or 10^{19} (10 to the nineteenth power) molecular conversions happening every second in your body! That's a lot of molecules moving around. In the very center of most of your 200 trillion cells are some very large molecules called *DNA*, the blueprint of life itself. If the *DNA* in one cell were unraveled and stretched out, it would be about 6 feet long. If you unraveled all the *DNA* molecules in your body and put them end to end, that would come to about 20 billion miles of *DNA* molecules, or about the distance you would travel to make 20 trips to the sun and back!

We live in a sea of molecules that we breathe, drink and eat. They connect all life around us and they run all life within us. Molecules are teensy weensy. In fact, molecules are so small, and so numerous and make us so interconnected, that statistically you have about a 50% chance of breathing an oxygen molecule on your next breath, that Jesus Christ breathed on his last breath! Think about that the next time you feel lonely or disconnected from Humankind! Since molecules are really important for the kind of medicine I practice, next I will define the term molecule.

mol·e·cule (mōl'ĕ-kūl) [from the Latin term *molecula* meaning little mass] 1. The smallest quantity into which a substance can be divided without loss of its characteristics

For example, if you took a glass of water and broke it down into smaller and smaller quantities, eventually you would get down to one molecule of H₂O. If that one molecule were to be broken down anymore, you would then have hydrogen and oxygen as separate molecules, which are gases. The characteristics of the liquid water would be lost. If you read the definition above again, it should now make sense. The field of science (see definition of science above) which studies the molecular basis of life is called **molecular biology**.

mo·lec·u·lar bi·ol·o·gy (mōlek'yeler bī-ol'ejē) *noun* 1. a branch of biology dealing with the ultimate molecular structure and organization of living matter and especially with the molecular basis of inheritance and protein synthesis

Orthomolecular Medicine

The kind of medicine which I practice emphasizes the recent discoveries of molecular biology, and it has been called **molecular medicine**. Using the definition of medicine above, **molecular medicine** would be the non-surgical prevention, alleviation and cure of disease, requiring both the knowledge (the science) of general truths and laws of **molecular biology**, and skills (the art) acquired by experience, study and observation of those general scientific truths and laws of **molecular biology**. Actually there is a better term to describe this kind of medicine: **orthomolecular medicine**. It

simply has the prefix *ortho* attached which I will define and then we can finally put the whole definition together.

ortho (ôr' the) [from Greek *orthos*] 1. straight
2. correct

Like an orthodontist who straightens and corrects the alignment of the teeth, or an orthopedist who straightens and corrects the alignment of the bones, an **orthomolecular medicine physician** straightens or corrects the alignment of the molecules in the body, using the science of molecular biology. Now I can finally give you the full definition of what it is that I do. I am an **orthomolecular medicine physician**, a doctor trained in psychology, who practices the art and science of medicine in order to restore health by being a teacher (doctor/*docēre*) of the natural (physician/*fisicien*), especially as it relates to the mind and behavior (psychology), by straightening out and correcting the alignment of the body's (including the brain's) molecules.

There are basically two kinds of molecules in the universe from the standpoint of life – those that enhance survival and optimal biological functioning (nutrients or good stuff) and those that threaten survival and interfere with biological functioning (toxins or bad stuff). The orthomolecular medicine strategy to attaining health (see definition above) or a state of complete physical, mental, or social wellbeing is elegantly simple. Based on my medical evaluation or workup (primarily laboratory testing of hair, saliva, blood, urine and stool), if any of the good molecules (nutrients such as amino acids, fatty acids, minerals) that life requires are missing, I help my patients put them back (supplementation). And if enough bad molecules (heavy metals, food allergy,

intestinal unfriendly flora) are found, I help my patients get rid of them (detoxification).

The extreme condition of missing a lot of good stuff is called starvation. The extreme condition having way too much bad stuff is called poisoning. Except for traumatic injury³, in a very real sense, the only way that a healthy person can ever get sick or die would be to have too many bad molecules and/or not enough good molecules in his/her body. Conversely, aside from structural anatomical problems, the only way that a sick person can ever become healthy again, would be to detoxify out the bad molecules and to restore his/her nutritional deficiencies. A thorough orthomolecular medicine evaluation and a subsequent course of treatment generally result in remarkably good outcomes for most chronic disorders, medical or psychiatric. As the insights and discoveries of molecular biology become widely available and are adopted by mainstream medicine, I would expect that many chronic “incurable” disorders will disappear during this century.

³ Possibly requiring a surgeon and trauma specialists