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NEGATIVE IONS: A Primer

Much is mentioned today about “negative ions”, “negative ion therapy,” and “anions”, whether in homeopathic or naturopath circles. However, the existence of negatively charged ions, and their effect on health and wellness, should not be constrained to any one discipline or modality. The interaction of negative ions with the human condition is a two hundred year old scientific fact and worthy of more research. Most importantly, it is worthy of more publication and education.



The Basic Science

For those who have forgotten their high school science, ions are charged particles in the air, formed when enough energy acts on a molecule (such as carbon dioxide, oxygen, water or nitrogen) to lose an electron. The displaced electron attaches itself to a nearby molecule, which then becomes a negative ion (also known by some as an “anion”). The original molecule (minus the electron) becomes positively charged and is known as a positive ion.

These ions, in turn, react with our environment, sometimes joining dust or pollutants to form larger particles. Small negative ions have a short life span and are highly mobile.

At the same time as our national forefathers were adopting our Constitution, Pierre Bertholon de Saint-Lazare, a French physicist, speculated that ions exist and affect people. He recorded the responses of medical patients to changes in the electrical state of the ambient air. More than a century later, in 1899, two scientists named Elster and Geitel proved the existence of ions. Only since the 1930s have researchers been

intensely investigating the consequence of their existence.

In nature, ions are formed in a variety of ways. About half are created by radioactive gases. Radioactive substances in the soil, cosmic rays, ultraviolet rays, air flow friction, falling water and plants all produce the other half. When these ions are charged, either negatively or positively, noticeable effects arise on humans. According to some researchers, positive ions rob us of our good senses and dispositions, while their counterpart, negative ions, enhance our dispositions, stimulating everything from plant growth to the human sex drive.

Where Are They?

Normally, only about one atom in 100,000,000,000,000 is ionized, making a total of perhaps 1000-2000 ions per cubic centimeter. These are usually balanced evenly between positive and negative, with a slight edge toward positive. Consequently, under normal conditions and expectations, the air we breathe and the environment we live in contains few charged ions, and those that are charged are fairly divided between negative and positive.

However, this normal condition may not be the optimal one for humans. On a seashore, where water is always falling, more ions are present and the ratio is about 2000 negative to 1000 positive. It is that 2:1 ratio that researchers indicate is the most favorable for humans.

Most people have experienced this natural effect, regardless of our proximity to waterfalls or the ocean. Every home has a built in, natural ionizer. Whether we use the shower for a brief two minute wake-up, or a much longer session, our daily bath rituals are, in effect, the practice of preventive medicine. Research has shown that falling water creates thousands of negative ions by splitting neutral particles of air, freeing electrons, charging them as they join up with smaller air particles. , thus giving them a predominantly negative charge.

Waterfalls have always been the favorite habitat of mystics and artists. The inspiration and romance generated at places like Niagara Falls and Yosemite have a direct relationship to the lowering of serotonin levels in the blood, caused by the waves of negative ions from the spray of these falls.

Conversely, desert and sea winds have an effect on neutral ions, but generally create more positively charged ions, sometimes creating a ratio of over 33:1. Scientists have noticed that people react negatively to approaching desert winds twelve to twenty-four hours before meteorological instruments note the coming natural effect. Studies of the Sharav in Israel, the Sharkiyeh along the Mediterranean, the African Hamsin, as well as the Californian Santa Ana winds all reflect the negative effects of these winds.

Positive ions are also created through man-made environments. Car exhausts, factory fumes, tire dust, cigarette smoke, cooking and heating fumes, dust and soot suppress negative ions and create positive ones. Steel and concrete buildings, as well as synthetic building materials, clothing and furniture, all absorb negative ions. Consequently, in a typical interior, the negative ion count may be below 100 per cubic centimeter, 10% of the minimal amount for optimum human functioning.

The Effect of Charged Air

Positive Ions

While five percent of the general population seems to react well (actually "euphoric") to the presence of

positive ions, most people do not. According to Russian research studies, ions act on the proper functioning of our central nervous system and, through it, the peripheral organs. Other scientists, as recently as 1970, determined that weather-sensitive people excrete more of the neuro-hormone serotonin than non-sensitive people. Serotonin is secreted by the pineal gland and the intestines. It affects sleep, mood, nerve impulses, blood-clotting and contraction of smooth muscles. LSD effects are caused by a serotonin inhibitor, and chronic serotonin depletion is characteristic of some types of mental anomalies.

Dr. Albert P. Krueger, an American who has pioneered much research into ions and ion therapy, discovered that the specific negative ion speeds up the rate at which serotonin is oxidized in the bloodstream. He also found that positive ions slow the sweeping action of the tiny hairs in our throats from 900 to 600 beats per minute and cut mucus flow, thus lowering our resistance to airborne allergens. In practical terms, carbon dioxide (which is a positively charged element) causes a shortening of the muscles of the back tracheal wall. Positive ions also cause vasoconstriction and increased respiration rate.

Negative Ions

The beneficial effect of negative ions was first discovered in 1932 by Dr. C.W. Hansell at RCA Laboratories. Dr. Hansell was startled by the violent mood shifts of a co-worker who sat beside an electrostatic generator. He observed carefully and discovered that a colleague was ebullient when the machine produced negative ions and morose when it made positive ions.

Subsequently researchers have found that negative ions reduce neurosis and anxiety, heighten appetite and thirst, and even stimulate sexual behavior. They improved performance of voluntary movements. (One study indicated that 81.2% of drivers with negative ion generators scored in the top half on driving tests, while 86% scored in the top half on reaction time.) In school, negative ions sharpen mental functioning and reduce error rates. One study indicated that after a year with negative ion generators in their classrooms, a group of kindergarten teachers reported that their students concentrated better and showed almost no 'weather effect.' Hyperactive kids were calmer, absenteeism was down, and the teachers themselves felt less fatigued.

Negative ions promote alpha brain waves and increase brain wave amplitude, which translates to a higher awareness level. Negative ion-induced alpha waves spread from the occipital area to the parietal and temporal and even reach the frontal lobes, spreading evenly across the right and left brain hemispheres. All of this creates an overall calming effect.

On the physical side, these charged ions have given relief from hay fever, sinusitis, bronchial asthma, allergies, migraines, and burn and post-operative pains. In addition to burn pain relief, negative ions lessen infections, dry the burns faster, heal them more quickly, and leave less scarring. (In one clinical review by Dr. Igho Hart Hornbluh, not only did 57% of surgery patients treated with large doses of negative ions (10,000/ccm) feel less pain (as opposed to 22.5% of controls), but restlessness and infection were also reduced and healing quickened.)

But why are ions therapeutic?

In the 1930s, a Russian research team determined that large ion doses of either polarity retarded bacteria colony formation on plates. Ionization also sterilized enclosed air. Later experiments noted an exponential bacteria decay rate of 23% per minute for untreated air, 34% per minute for air with positive ions, and 78% per minute for negatively charged air. The researchers determined that the negative ions actually killed the bacteria.

This effect is mirrored in animals as well. Studies show that rats learn better and are less anxious. Mice live longer. Silkworm eggs hatch earlier, larvae grow faster, spinning begins sooner, and cocoons are heavier. Chickens lay more eggs and grow plumper. Sheep grow faster and supply more wool.

And in the vegetable kingdom, plant seedlings grow up to 50 percent more when charged. Fruit, more studies reflect, stays fresh longer.

In humans, most researchers think that negative ions act on our capacity to absorb and utilize oxygen, accelerating the blood's delivery of oxygen to our cells and tissues. The miraculous nature of these conclusions, though, has limitations. Researchers report that negative ions work only so long as they are being inhaled. As the charge is most readily absorbed through the olfactory nerves, optimally one needs to breathe them in through the nose. As Dr. Krueger has cautioned: "the biological (non clinical) effects produced by

atmospheric ions are not dramatic; on the contrary, they tend to be limited in degree."

Can Negative Ions be Generated?

Artificially generated ions present an even more compelling story than those created naturally in the atmosphere. Just as positive ions can be generated artificially by pollution, negative ions can be made with negative ion generators.

Although most people in the U.S. are not ion-wise, generators have been popular elsewhere in the world for decades. In World War II, Luftwaffe planes were negatively ionized by electric field generators, in order to reduce pilot fatigue. Germany and the former U.S.S.R. used them in government buildings, hospitals, schools, factories, restaurants, health spas, beauty salons, homes, offices, cars and trucks.

In the United States, the Navy has equipped nuclear submarines with ion machines. Ionizers are being used industrially in auto spray paint booths, food processing plants, grain storage bins and chemical spray factories.

Architects and designers are beginning to see the health benefits from fountains and rooftop solariums placed in urban environments, echoing the wisdom of their forefathers in the Roman culture. The growing recognition of our biological needs amidst our artificial interiors is opening up whole new industries armed at replicating nature indoors.

