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When someone says if BPI kills bacteria why doesn't it affect our lungs…. The simple biologic answer is that:

(1) Bacteria are simple single celled organisms whereas humans are complex multicellular beings.
(2) Bacteria have a totally different outer cell envelope compared to humans— bacteria have a cell wall whereas humans have NO cell wall
(3) Bacteria are very primitive Procaryotic cells whereas humans are comprised of advanced Eucaryotic cells. In fact, these differences are the very reason that antibiotics kill bacterial cells without killing humans!!!!

BACKGROUND:
Ionization is part of a healthy atmosphere. It is one of nature's tools for maintaining and cleaning the air. Though positive and negative ionization exist together naturally in the atmosphere, and abundance of negative ionization appears to have very beneficial effects on humans, animal, and plants while an abundance of positive ionization must be tempered. Human activities tend to decrease the amount of negative ionization in the atmosphere. The problem is only greater when examined in the context of the indoor environment, especially if one considers how much time the average city-dweller spends breathing indoor air. Technology designed to generate negative air ions can appropriately address many issues related to indoor air quality. With a wider dissemination of this information, perhaps a wider range of indoor environments will realize benefits from this technology. Ionization is part of a healthy atmosphere. It is one of nature's tools for maintaining and cleaning the air. In the second half of the 20th century studies began to appear specifically stating the helpful biological effects of negative air ions. According to Pogrund (Sulman, p. 165), the reported physiological effects of negative air ionization include:

1. Decreased respiratory rate
2. Decreased basal metabolic rate
3. Decreased blood pressure
4. Produced a feeling of well being
5. Increased vital capacity
6. Decreased skin temperature
7. Acceleration of the conversion of succinate to fumerate
8. Stimulation of cytochrome
9. Decreased eosinophilia and lymphocyte count
10. Increased CO2 combing power of plasma
11. Decreased blood sedimentation rate

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12. Decreased muscle chronaxie
13. Increased ciliary activity
14. Increased frequency of mitosis
15. Increased resistance to infection
16. Suggested as therapy in chronic rhinitis, sinusitis, migraine, insomnia, tuberculosis, wound and burn healing, asthma, hay fever, emphysema, bronchitis, conjunctivitis, chlorine gas poisoning, preventing thromboembolism.

This characteristic of negative ionization is also responsible for the added benefit it provides of elimination of odors in addition to destroying microbes. The acceptable minimum concentration of negative ions for *indoor air* is 200-300 ions per cm3. The optimal level is 1000-1500 negative ions per cm3 (Jokl, p. 289) or higher. However, the reality is that the concentration of negative ionization in the outdoor air is sometimes far below this acceptable minimal value, especially in cities. The situation is worsened by the fact that many characteristics of the indoor environment have the effect of reducing the amount of naturally available ionization. The walls of buildings tend to decrease and even eliminate the normal atmospheric ionization. Walls constructed using wood or brick cause only a small reduction in atmospheric ionization. However, walls made of steel or of iron and concrete, create a Faraday cage effect around the enclosed space, shielding the interior from the outside ionization (Jokl, p. 274). As discussed earlier, ionized air molecules will help eliminate chemical and particulate pollutants from the indoor air, however, the greater the volume of pollutants the more the ionization is reduced. Ventilation, heating, and air conditioning systems also reduce air ionization. The effect of propelling air through metal ducts reduces negative ionization at a loss of 20% every two meters (Jokl, p. 276). This process can also produce a lot of positive ions. These effects are made worse with drier air and warmer ducts (Sulman, p. 105). Human occupancy further diminishes the supply of negative ionization in indoor air. Human activities introduce particulate and chemical pollutants, as well as microbes to the indoor environment. Additionally, all sources of fire (even the burning of natural gas) (Sulman, p. 106), and especially cigarette smoking (Jokl, p. 276), directly add large quantities of positive ions to the indoor air. Together, these indoor environmental factors contribute not only toward a decrease in the naturally available negative ionization, but at the same time significantly increase the pollutants, microbes, and odors present in the enclosed atmosphere.

SOLUTION:

A solution that addresses all these problems is technology designed to augment the negative ionization in the air such as AtmosAir. Such devices have existed since the early part of the 20th century, however, not without two bothersome side effects. The most troubling side-effect of many machines designed to create negative ions is that some can also create ozone (O3).

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Although small amounts of ozone occur naturally in the atmosphere, in sufficient quantity its effects are toxic to humans (Sulman, p. 106) but this is not the affect caused by Atmosair.

ATMOSAIR BPI:

Simply put there are two possible scenarios of BPI that can occur on a molecular level: Firstly, the effect of BPI on microorganisms or other particulates results when positive (H+) and negative (0-) ions cluster on the surface of microbes causing a chemical reaction that creates highly reactive OH groups called hydroxyl radicals (0H-) which have a half-life of 2 seconds (quickly becoming hydroxyl groups) and which are charge *neutralized* instantly with many substances. This fact makes hydroxyl radicals one of the safest processes for *disinfection* and these are the main effector molecules that kill microbes. This process reduces many of the positive ions in the ambient environment. In fact, these hydroxyl radicals (0H-) have a standard oxidation potential of 2.81 considerable greater than H2O2 (1.78) and O3 (2.07). Note that OH radicals are formed on the cell membrane surface of microbes (single celled organisms) , are short lived, and remove H from the surface proteins thereby damaging the cell membrane ultimately forming H2O. Note the positive oxygen ions (namely dioxygen cation O2+) is very short lived because it is unstable. The only stable oxygen ion produced is the negatively charged superoxide anion O2- .Both types of negative ions produced – the superoxide anion[O2-] and the [OH-] radical, swing the balance of ions to negative by converting many positive ions to neutral. Remember in the spreadsheet of nature there is most always a balance towards net neutrality of remaining particles.

The second possible reaction of BPI is that the oppositely charged ions cause these highly reactive particles to attract to other particles, or themselves becoming bigger and heavier, by the *process of agglomeration* which then allows them to fall to the ground by gravity thusly taking them out of the air and which never allows them to even get to the filters. Alternatively, the increase in size of the particles by agglomeration allows the particles to be better trapped by the filters, which now more efficiently can remove these larger particles. Keep in mind that in normal healthful “fresh air” there is approximately 2000-3000 total ions per cu cm. In the production of BPI there is a 60% negative ions to 40% positive ratio. In addition, there is a study done by Dr Has Hurni in Sisseln, Switzerland which reports the compatibility of ionized air with humans and animals. It is most important to note that bipolar ionization kills microbes without damaging DNA (therefore it does not cause cancer) in the interior of cells and unlike other physical and chemical agents, such as UV light, radioactivity and use of caustic chemicals, BPI is totally safe and it does NOT adversely affect the environment in any way. Despite public health awareness and progress on outdoor air pollution, progress on indoor air pollution has significantly lagged behind. Air ionization, although historically well documented and technologically well advanced, is just now entering the field of treatment of specific targets in indoor environment, which directly affects the quality of indoor air and brings with it the potential for associated health benefits!

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Richard A. Huggins, BS in Electronics, University of California, MS in Electrical Engineering, Stanford. Mr. Huggins is the former CEO and Chief Engineer of Huggins Engineering, former CEO and Chief Scientist of both PEK Labs, and Cybergen Systems. Anthony J. McGettigan, BA in Psychology, California State University. Mr. McGettigan is a technical writer and author.Abstract: Atmospheric ionization as related to the indoor and outdoor environments.Benefits of negative ionization are discussed. Patented solutions by RC Enterprises(Chico, California) generate negatively ionized oxygen molecules, improving indoor airquality without creating ozone and without plating interior wall with dirt.

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