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OZONE.
A New Medical Drug

2nd Edition

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ISBN 978-90-481-9233-5 e-ISBN 978-90-481-9234-2
DOI 10.1007/978-90-481-9234-2
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2010936097

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Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Introduction

Ozone is a natural gaseous molecule made up of three oxygen atoms whereas the oxygen molecule, far more stable, is composed of only two atoms.

Christian Friedrich Schonbein (1799–1868) discovered ozone in 1840, when, working with a voltaic pile in the presence of oxygen, noticed the emergence of a gas with an "electric and pungent smell" that could be a sort of "super-active oxygen". We can smell it during a thunderstorm because the electric discharge of lightning, between the clouds and the earth, catalyses the formation of ozone from atmospheric oxygen. Although Schonbein had probably guessed that ozone could be used as disinfectant, his intuition did not save him when he contracted a Bacillus anthracis infection while exploring a chemical method for preserving meat. The concept that ozone derives from oxygen when an electric discharge was generated by a voltaic arc was practically applied by the chemist Werner von Siemens, who invented the so-called super-induction tube (Siemens's tube), consisting of two interposed electrode plates set at a high voltage which, in the presence of oxygen, could generate some ozone. It became possible to produce ozone at will and clarify that ozone is indeed a very reactive, unstable and unstorable gas that had to be produced "ex tempore" from oxygen and used at once. Industrial ozone generators could then be used for industrial application and disinfection of water, after it was shown the potent and broad bactericidal activity of ozone. Today nobody doubts about its strong disinfectant properties and there are more than 3,000 municipal treatment facilities in the world. As the need of water increases daily and it is indispensable to prevent the spread of infectious diseases, the importance of ozone for practical applications becomes immense. The International Ozone Association (IOA) carefully supervises all the applications and publishes a good scientific journal "Ozone Science and Engineering". So far, one weak point has been not to pay enough attention to the medical applications because this is not IOA's main purpose.

The first medical application seems to have been the use of ozone for treating gaseous, post-traumatic gangrene in German soldiers during the 1st world war. However a big step forward was the invention of a reliable ozoniser for medical use by the physicist Joachim Hansler (1908–1981). The idea to use ozone in medicine developed slowly during the last century and it was stimulated by the lack of antibiotics and the disinfectant properties of ozone. Not surprisingly a Swiss dentist, E.A. Fisch (1899–1966) was the first to use ozone in his practice. By a

twist of fate, Dr. E. Payr (1871–1946), a surgeon had to be treated for a gangrenous pulpite and soon realized the efficacy of the ozone treatment in surgery to become so enthusiastic to report his results at the '59th Congress of the German Surgical Society in Berlin (1935) and write: "which other disinfectant would be tolerated better than ozone? The positive results in 75% of patients, the simplicity, the hygienic conditions and innocuity of the method are some of the many advantages".

In 1936, in France, Dr. P. Aubourg proposed to use the insufflation of oxygen-ozone into the rectum to treat chronic colitis and fistulae.

How could ozone be administered for internal use? It seems that Dr. Payr was the first to inject gas with a small glass syringe directly into the vein but he was very careful in slowly delivering a small volume of gas. Unfortunately this route was later on adopted by charlatans and technicians without any medical qualification who, by injecting large volume (up to 500 ml in 2 h) have often caused lung embolism mostly due to oxygen and even death. Although this practice has been prohibited since 1984, quacks still uses in third-world countries and certainly it represents one good reason for prohibiting all at once the use of ozone. In most States of USA, the FDA has forbidden the use of ozone and this fact has negatively influenced a correct development of ozonetherapy, that, however, is more or less tolerated in other parts of the world. It is regretful that brilliant pioneers as Fisch, Payr, Aubourg and Dr. H. Wolff (1927–1980), the inventor of ozonated autohemotherapy, have been betrayed by a horde of unscrupoulous and false doctors. If that was not enough, **another serious obstacle has been created in the USA by the ruling dogma that "ozone is always toxic any way you deal with it"**. This was the phrase that one of the best ozone chemists wrote me in 1995. Although I tried to discuss with him showing our data contradicting his dogmatic assertion, he has preferred not to discuss further this issue. When, on June 2002, I sent him my book that critically examined ozone therapy, only his secretary, after a second request, briefly informed me that he had received the book! In the medical field, history has repeatedly shown that not all dogmas are tenable and the one on ozone stands up mostly on the basis of prejudice, medical incompetence and previous bad work. While I fully agree with the experts that ozone is one of the strongest oxidants and an intrinsically toxic molecule, on the basis of our biological and clinical data, **I am sure that ozone, if used in judicious dosages, can be tamed by the potent antioxidant system present in cells and biological fluids**. Obviously, during an inflammatory process, an excessive, continuous and localized release of ozone can be detrimental whereas, depending upon a minimal concentration, short time of exposure and biological location, **the now famous three gaseous molecules: CO, NO and O_3 can act as crucial physiological activators**.

The problem of ozone toxicity is of paramount importance and it will be fully clarified in this book. The interested reader can browse through Chapter 2 of my previous book (Bocci, 2002) where this long controversy was described. I feel confident that slowly in the future, in spite of several drawbacks, the therapeutic value and the lack of adverse effects will become evident to everyone and this complementary approach will be widely used in medicine.

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