AUCTORES
Globalize your Research

Journal of Cancer Research and Cellular Therapeutics
Yuri Pivovarenko*

Open Access

Research Article

Cancer and thrombosis can be associated because both have a common cause, which is the positive electrization of a person's internal environment

Yuri Pivovarenko

Research and Training Center 'Physical and Chemical Materials Science' Under Kyiv Taras Shevchenko University and NAS of Ukraine, Kiev, Ukraine

***Corresponding Author:** Yuri Pivovarenko. Research and Training Center 'Physical and Chemical Materials Science' Under Kyiv Taras Shevchenko University and NAS of Ukraine, Kiev, Ukraine.

Received Date: April 15, 2024; **Accepted Date:** April 23, 2024; **Published Date:** April 30, 2024

Citation: Yuri Pivovarenko (2024), Cancer and thrombosis can be associated because both have a common cause, which is the positive electrization of a person's internal environment, *J. Cancer Research and Cellular Therapeutics*, 8(3); **DOI:10.31579/2640-1053/194**

Abstract

It has been established that positively electrized water has an exceptionally high hydrating ability; the extrapolation of this ability of positively charged water on the human body allows assuming that it is the positive electrization of the human internal environment that can simultaneously cause both cancer and thrombosis. It was also established that negatively electrized water has a dehydrating ability; this ability of negatively charged water allows perceiving means that contribute to the negative electrization of the internal environment of a person as being able to treat both cancer and thrombosis.

Keywords: cancer; thrombosis; hydrogen therapy; ROS

Introduction

Currently, the involvement of reactive oxygen species (ROS) in the formation of both cancer and thrombosis has been described in detail [1-6]. At the same time, these descriptions ignore the fact that the formation of superoxide anions in mitochondria, which are the precursors of numerous ROS [7], is associated with the release of protons (Figure 1): $H\bullet + O_2 \rightarrow H^+ + O_2^-$ (1).

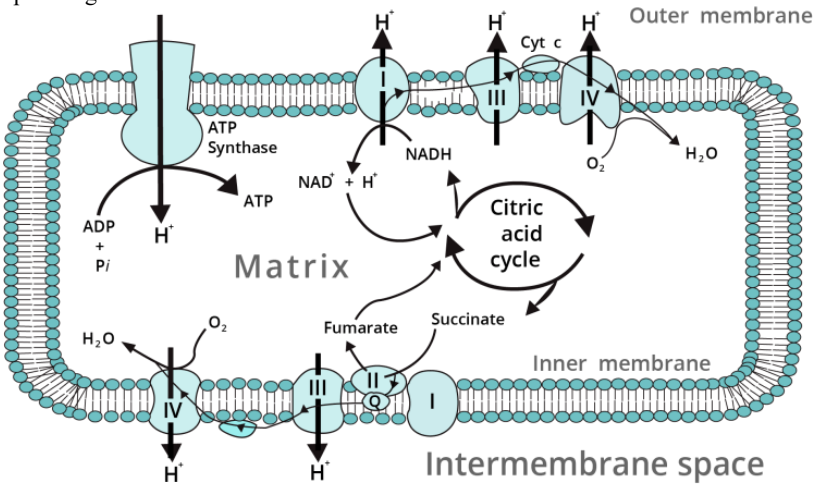

Figure 1: This is a typical diagram of a working mitochondrion: during the oxidation of hydrogen atoms and the formation of superoxide anions, mitochondria release protons (according to [7-9]).

Therefore, these same descriptions ignore the fact that the formation of superoxide anions in mitochondria necessarily causes positive electrization of the entire internal environment of a person (at the same time, one should take into account the exceptionally high penetrating

ability of positively charged water [10]). As a result, the extremely high hydrating capacity of positively charged water is also ignored, which cannot be accepted.

Perhaps some experimental results will make this statement more clear, and the further discussion more meaningful.

Materials and methods

Negatively charged water was produced by passing hydrogen gas through uncharged water (Figure 2, left) [10, 11].

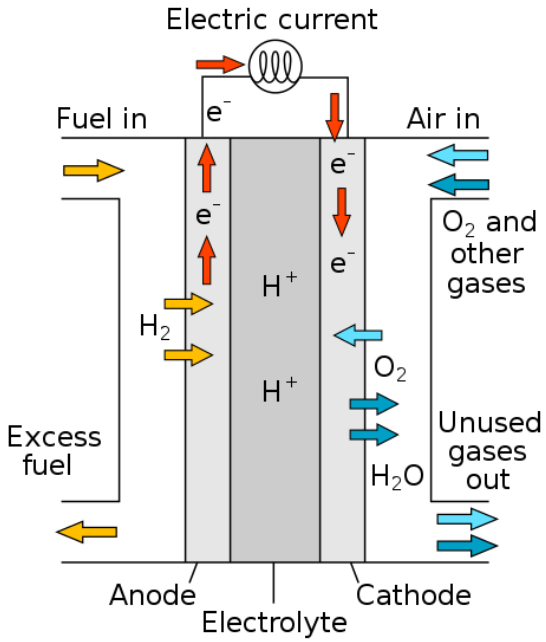

Figure 2. This is a diagram of a hydrogen-air electrochemical cell. The red arrows indicate the movement of electrons from a compartment containing an aqueous solution bubbled with hydrogen gas to a compartment containing an aqueous solution bubbled with air. So, this diagram shows that water acquires a negative charge when it comes in contact with hydrogen gas and a positive charge when it comes in contact with air [10, 11].

Negatively charged water was also produced by filtering uncharged water through activated carbon [10], which is a sorbent of aqueous hydrogen ions [12].

Positively charged water was produced by passing oxygen gas through uncharged water (Figure 2, right) [10, 11]. Positively charged water was also produced by filtering uncharged water through silica gel [10], which is a sorbent of aqueous hydroxyl ions [12].

Water with the required electrical potential was obtained in two ways:

1. By varying the depth of the layer of sorbent through which filtered water is discharged.

2. By varying the time during which the gas passed through the uncharged water [10].

The electric potential of the charged water was measured with respect to uncharged water, the potential of which was conditionally assumed equal to 0 mV [10].

All reagents were purchased from Ukrreachim (Ukraine).

Results

So, numerous experimental data prove that the hydrating ability of water is determined by its electrical charge (potential) (Figures 3-7).

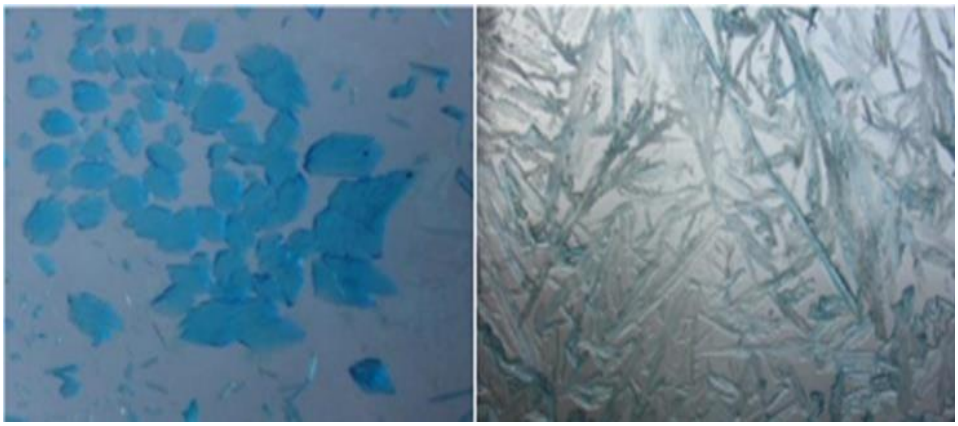

Figure 3. Left: intensely blue (i.e. more hydrated [12]) prismatic crystals formed in a $CuSO_4$ solution prepared with positively charged water. Right: pale blue or colourless (i.e. less hydrated or unhydrated [12]) vegetable crystals formed in a $CuSO_4$ solution prepared with negatively charged water).

Figure 4. This is a suspension obtained by intensive shaking of graphite powder with positively charged water.

Perhaps the fact that this suspension has remained unchanged for several years is worth noting (it is also worth considering that graphite is considered insoluble in water [12]).

Figure 5. This is what hydrated collagen granules look like in a Petri dish, the bottom of which contains oppositely charged areas. Weaker hydration of collagen granules is observed in the negatively charged area of the bottom (left); stronger hydration of collagen granules is observed in the positively charged area of the bottom (right).

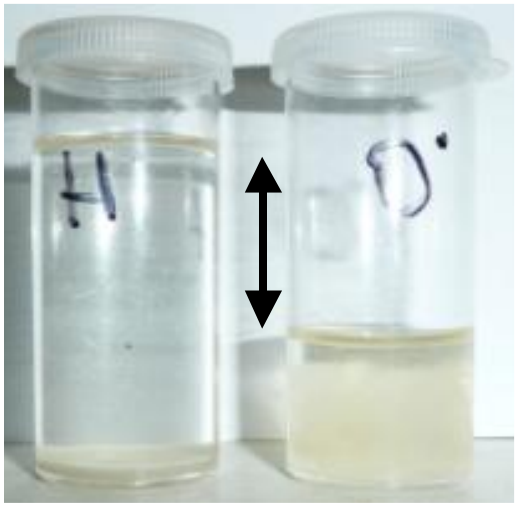

Figure 6. This photo shows how starch swells in water at different electrical potentials: starch does not swell at all in water at a potential of -500 (left), but swells for 20 – 30 minutes in water at a potential of +500 mV (right).

Negative potential water was produced by bubbling uncharged water with hydrogen gas (left); water with positive potential was produced by bubbling uncharged water with oxygen gas (right) (see Figure 2).

At the same time, it was established that positively charged water has an extremely high penetrating ability, thanks to which it can evaporate even

from closed plastic vials: the arrow shows how much the level of such water has decreased over the day. Both water used had 20 – 22 °C [10].

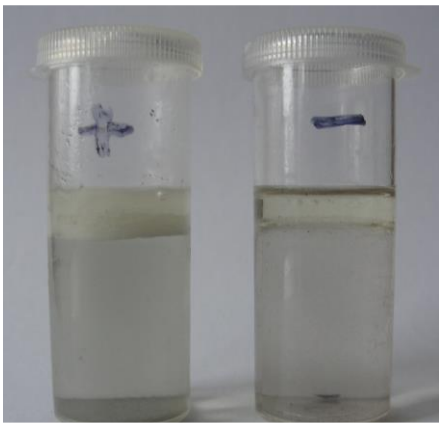

Figure 7: Suspensions formed by intensive mixing of liquid oils with positively charged water do not delaminate for several hours, retaining a milky white or yellowish colour (left); suspensions formed by intensive mixing of the same oils with negatively charged water separate within minutes (right) [13-15].

Therefore, the results presented in Figures 3 – 7 allow making sure that positively charged water hydrates different substances better than negatively charged water. In particular, the results presented in the right parts of Figures 5 and 6 prove that it is positively charged water that turns biopolymers into gels that have the properties of well-known adhesives, namely bone glue and starch paste; at the same time, the results presented in the left parts of Figures 5 and 6 prove that negatively charged water practically does not interact with the same biopolymers.

Discussion

Thus, there is enough evidence that it is positively charged water that is able to hydrate substances of different chemical nature, including biopolymers (Figures 3 – 7). From the point of view of the topic stated in the title of the article, it is especially important that it is positively charged water that is capable of converting biopolymers into hydrogels, including the well-known bone glue (Figure 5, right) and starch paste (Figure 6, right), since this allows assuming that it is the positive electrization of the blood that promotes the gluing of its individual blood components and, accordingly, the formation of blood clots from them. In addition, this allows assuming that it is the positive electrization of the glycolyzed inner surfaces of blood vessels [16-18] that gives them adhesive properties, thanks to which they can retain blood clots.

At the same time, this means that cells are able to accumulate precisely positively charged water due to the hydration of all cellular components. Given that this accumulation is a prerequisite for cell proliferation, the assumption that positive electrization of the human internal environment promotes tumor growth [13-15] seems quite justified.

Apparently, all this allows assuming that it is the positive electrization of the internal environment of a person that can contribute to both thrombosis and tumor growth at the same time. In any case, it is this assumption that explains the fact that thrombosis is usually associated with cancer, or vice versa [19-21]. In any case, it is this assumption that well explains the involvement of ROS in the occurrence of both thrombi and cancer; of course, at the same time, it is worth considering the fact that the formation of ROS in mitochondria is associated with the release of protons (Figure 1). All this, accordingly, means that ROS present near blood clots or in tumors are only indicators of positive electrization of the respective environments, and not the root cause of thrombosis and cancer.

Likewise, the results presented in Figures 3 – 7 allow assuming that both thrombosis and cancer can be treated by negative electrization of the human internal environment. It should be noted that this very assumption correlated well with the success of hydrogen inhalation in the treatment of both of these pathologies [22-25]; of course, the ability of hydrogen gas to negatively electrify the water environment (Figure 2, left) should also be taken into account.

Conclusion

In any case, the proposed point of view seems to be quite productive, as it allows considering the nature of several pathologies from a single point of view. In view of this, ignoring the disease-causing effect of protons released in mitochondria during the formation of superoxide anions seems unacceptable, especially considering the exceptionally high penetrating and hydrating ability of positively charged, i.e. protonated, water.

Apparently, the same point of view should be kept in mind when explaining the appearance of other diseases, which are now associated exclusively with the pathogenicity of ROS [26-29].

References

1. Zhang B. and Zehnder J.L. (2016). ROS: novel regulators of thrombopoiesis. *Blood*. 128(5), 613-614.
2. Kong H. and Chandel N.S. (2018). Regulation of redox balance in cancer and T cells. *Journal of Biological Chemistry*. 293, 7499-7507.
3. Nakamura H. and Takada K. (2021). Reactive oxygen species in cancer: current findings and future directions. *Cancer Science*. 112(10), 3945-3952.
4. Cheung E.C. and Vousden K.H. (2022). The role of ROS in tumour development and progression. *Nature Reviews Cancer*. 22, 280-297.
5. Bettiol A., Galora S., Argento F.R. et al. (2022). Erythrocyte oxidative stress and thrombosis. *Expert Reviews in Molecular Medicine*. 24.
6. Li P., Ma X. and Huang G. (2024). Understanding thrombosis: the critical role of oxidative stress. *Hematology* 29(1).
7. Palma F.R., Gantner B.N., Sakiyama M.J. et al. (2024). ROS production by mitochondria: function or dysfunction? *Oncogene*. 43, 295-303.
8. Nelson N., Perzov N., Cohen A. et al. (2000). The cellular biology of proton-motive force generation by V-ATPases. *Journal of Experimental Biology*. 203(1), 89-95.
9. Daniel H., Spanier B., Kottra G. and Weitz D. (2006). From bacteria to man: archaic proton-dependent peptide

transporters at work. *Physiology* (Bethesda), pp. 93-102.
10. Pivovarenko Y. (2018). ±Water: demonstration of water properties, depending on its electrical potential. *World Journal of Applied Physics*. 3(1), 13-18.
11. Pivovarenko Y. (2019). Biochemical and physiological basis for treating hydrogen gas as a medicine. European *Journal of Preventive Medicine*. 7(6), 100-107.
12. Nekrasov B.V. (1974). Basics of general chemistry, 1. Moscow: *Chemistry*. In Russian.
13. Pivovarenko Y. (2023). Positively charged water as a tumor growth stimulator. *Biomedical Sciences*. 9(3), 64-72.
14. Pivovarenko Y. (2023). Again, about the ability of positively charged water to promote cell division. *International Journal of Clinical Case Reports*. 2(1), 1-9.
15. Pivovarenko Y. (2023). Catalytic properties of positively charged water promoting tumor growth. *Journal of Cancer Research and Cellular Therapeutics*, 7(5).
16. Wright J.N., Collins H.E., Wende A.R. and Chatham J.C (2017). O-GlcNAcylation and cardiovascular disease. *Biochemical Society Transactions*. 45(2), 545-553.
17. Loaeza-Reyes K.J., Zenteno E., Moreno-Rodríguez A. et al. (2021). An overview of glycosylation and its impact on cardiovascular health and disease. *Frontiers in Molecular Biosciences*. 16.
18. Chatham J.C. and Patel R.P. (2024). Protein glycosylation in cardiovascular health and disease. Nature Reviews Cardiology.
19. Razak N.B.A., Jones G., Bhandari M. et al. (2018). Cancer-associated thrombosis: an overview of mechanisms, risk factors, and treatment. *Cancers* (Basel. 10(10).
20. Fernandes C.J., Morinaga L.T.K., Alves Jr. J.L. et al. (2019). Cancer-associated thrombosis: the when, how and why. *European Respiratory Review*.
21. Khorana A.A., Mackman N., Falanga A. et al. (2022). Cancer-associated venous thromboembolism. *Nature Reviews Disease Primers*. 8(1).
22. Qian L., Wu Z, Cen J. et al. (2019). Medical application of hydrogen in hematological diseases. *Oxidative Medicine and Cellular Longevity*.
23. Wang Y., Wu Y.P., Han J.J. et al. (2019). Inhibitory effects of hydrogen on in vitro platelet activation and in vivo prevention of thrombosis formation. *Life Sciences*, 233.
24. Li S, Liao R., Sheng X. et al. (2019). Hydrogen gas in cancer treatment. *Frontiers in Oncology*, 9.
25. Noor M.N.Z.M., Alauddin A.S., Wong Y.H. et al. (2022). A systematic review of molecular hydrogen therapy in cancer management. *Asian Pacific Journal of Cancer Prevention*, 24(1), 37-47.
26. Ozawa T. (1997). Oxidative damage and fragmentation of mitochondrial DNA in cellular apoptosis. Bioscience Reports. 17(3), 237-250.
27. Alfadda A.A. and Sallam R.M. (2012). Reactive oxygen species in health and disease. *BioMed Research International*.
28. Casas A.I., Dao V.T., Daiber A. et al. (2015). Reactive oxygen-related diseases: therapeutic targets and emerging clinical indications. *Antioxidants & Redox Signalling,* 23(14), 1171-1185.
29. Yang S. and Lian G. (2020). ROS and diseases: role in metabolism and energy supply. *Molecular and Cellular Biochemistry*, 467(1), 1-12.

DOI:10.31579/2640-1053/194