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Case Report

DMSO as an Anticancer Agent

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Abstract

It has been previously shown that positive electrification of the human internal environment contributes to its excessive hydration and, consequently, to the development of cancer. This alone allows understanding why DMSO, which binds water protons and removes them from the human body, is an effective anti-cancer agent. At the same time, other properties of DMSO may also contribute to its anti-cancer activity. Thus, it may be quite important that DMSO is able to remove HO radicals from 8-HO-Guanines, which are characteristic of cancer cell DNA, thereby converting them into unoxidized Guanines, which are characteristic of healthy cell DNA. Taking all this into account, it is appropriate to consider DMSO as an anticancer agent that can act at both the physicochemical and genetic levels. Therefore, specific examples of the use of DMSO in anticancer therapy deserve attention.

Key words: cancer; dimethyl sulfoxide; DMSO

Introduction

It seems obvious that water is the main substance of any cell. Perhaps it is this obviousness that makes it easy to accept the idea that cell proliferation is impossible with a water deficit. On the other hand, developing this same idea, one can conclude that it is the excess hydration of connective tissue cells that stimulates their non-stop division, which ultimately causes tumor growth. In any case, the hypothesis that it is precisely the excessive hydration of connective tissue cells that is a necessary prerequisite for the development of cancer was eventually put forward by McIntyre [1, 2].

Considering that this hypothesis seems to be in principle undoubted, there was a need for its further development. Thus, it was shown that it is positively charged water (i.e., water enriched with uncompensated protons) that has an exceptionally high penetrating and hydrating capacity and is therefore capable of both penetrating cells and accumulating in them; in parallel, it was shown that negatively charged water (i.e., water enriched with uncompensated hydroxyl ions) lacks these qualities and is therefore unable to penetrate cells and, accordingly, accumulate in them. Therefore, it was suggested that it is the positive electrification of the internal environment of a person that contributes to the development of cancer [3 – 7]. Accordingly, the idea that cancer could be stopped by lowering the content of protons in a patient's body seemed plausible enough. In this regard, the search for means to practically implement this idea seemed very relevant. Apparently, this is why the physicochemical properties of dimethyl sulfoxide (DMSO) could not go unnoticed.Thus, it is believed that DMSO binds water protons, thereby preventing the formation of water structures, including ice-like ones [8], which are similar to the hydration shells of various biopolymers, including DNA [3, 9]. (All this, in particular, is exhaustively confirmed by the fact that it is DMSO that is most often added to biological objects subjected to deep freezing.) At the same time, no less important in the context of the topic under discussion is the fact that protonated DMSO is quickly excreted from the human body, thereby reducing its positive electrification and, as a consequence, its hydration. Thus, even the physicochemical properties of DMSO allow considering it as an anti-cancer agent, of course, accepting the above concepts of the origin of cancer [1, 2, 4 – 7]. At the same time, it is worth noting that other properties of DMSO may also determine its anti-cancer properties. Thus, no less important may be the potential ability of DMSO to extract HO radicals from 8-HO-guanines [10, 11], thereby returning DNA to a state characteristic of healthy cells [12].

However, it should be taken into account that during such extraction, DMSO releases methyl radicals [10, 11], which are capable of methylating both DNA Cytosines and histones that are in close contact with DNA [13 – 15]. Thus, it is this extraction that may be accompanied by methylation, the contribution of which to carcinogenesis is currently considered controversial [14, 16–19]. Taking all this into account, it is now appropriate to consider DMSO as an agent that clearly reduces the degree of cellular hydration, as well as an agent that can presumably have a positive effect both on the cell genome and its regulation. Be that as it may, it is worth discussing the most convenient (for both doctors and patients) use of DMSO in anti-cancer therapy, as well as the results of this use.

Discussion

First, it is worth considering that the cytoplasm of neurons constantly moves from the nucleus to the ends of the axons; Figure 1 gives an idea of this movement.

Figure 1. In this way, the authors sought to convey to readers an idea of the cytoplasmic flows that exist in the neurons of the human brain [20].

Secondly, it is worth considering the configuration of the spinal cord (Figure 2). Obviously, all this taken together allows considering rubbing DMSO into the part of the spinal cord that innervates the organ affected by cancer as a means of providing a fairly effective targeted delivery of DMSO; of course, this treatment method is based on the ability of DMSO to easily penetrate the skin [8, 21]. While all of these considerations seem quite reasonable, it is worth describing a few specific cases of DMSO being used to treat certain types of cancer.

Thus, daily half-hour rubbing of DMSO for ~1 month into the area of the spinal cord that innervates the female genital organs (Figure 2, bottom) rid the patient of two uterine tumors with a diameter of ~1 cm and a length of at least 10 cm. (In this case, the underlying cause of the development of these tumors was apparently a lumbar spine injury sustained by the patient when she fell on a ski slope.)

Perhaps the following example of such use of DMSO should be recognized as the most impressive. Thus, rubbing DMSO for 1 hour daily into the area of the spinal cord innervating the lower parts of the intestine (Figure 2, bottom) in 3 days rid the patient of two approximately spherical tumors with a diameter of ~5 cm, formed on the inner surface of the large intestine. (In this case, the tumor development was apparently triggered by a lumbar spine injury sustained by the patient while lifting a heavy weight.) It is probably worth noting here that the rubbing in both cases described was done exclusively in the direction from the coccyx to the neck, that is, in the direction of the lymph flow; it was believed that this type of rubbing does not damage the fragile lymphatic vessels [22, 23].

At the same time, it is worth adding that other uses of DMSO have not been entirely successful. Thus, a 30-minute application of cotton wool soaked in pure DMSO to a tumor with a diameter of ~8 cm that formed on the outer surface of the lower lip caused both the complete disappearance of the tumor and profuse bleeding from the lower lip, which had to be urgently stopped. Despite this complication, all doubts about the antitumor properties of DMSO disappeared. However, this case allowed concluding that any tumor can compress blood vessels, thereby making it difficult for them to receive nutrients that are necessary, in particular, for the constant renewal of the vessel walls.

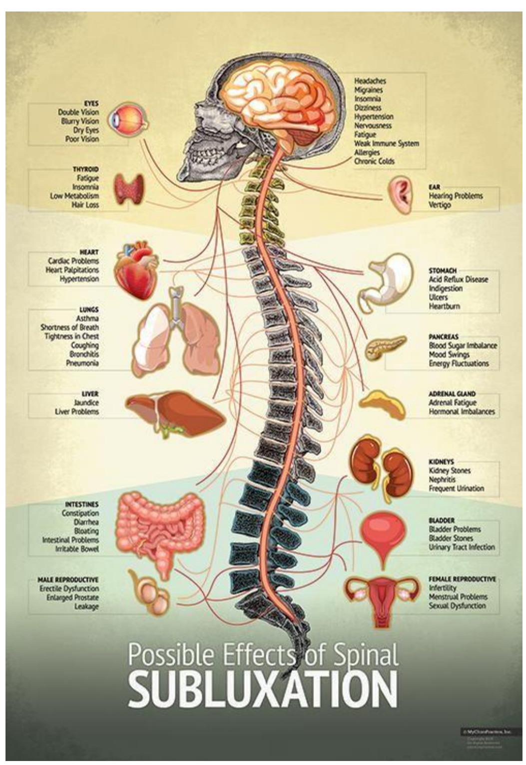

Figure 2. This diagram, in particular, gives an idea of the location of the spinal nerves that innervate specific organs [24, 25].

Conclusion

One way or another, there is sufficient evidence to consider DMSO as a cell dehydrating agent and thus an anticarcinogenic agent (in full accordance with McIntyre's hypothesis [1, 2]). At the same time, the fact that DMSO is capable of binding water protons [8] and removing them from the human body allows us to consider it as a means of reducing the positive electrification of the internal environment of the human body and, consequently, as an anti-cancer agent (of course, accepting the proposed point of view on the root cause of carcinogenesis [1, 2, 5 –7]).

While all these considerations provide a quite satisfactory explanation for the anti-cancer properties of DMSO, its putative ability to positively influence the genetics of cancer cells also cannot be ignored; in any case, it should be taken into account that DMSO is capable of removing OH radicals from 8-OH-Guanines [10, 11] and, thus, returning DNA to a state characteristic of healthy cells [12]. (In other hand, the proposal to consider cell electrification as an epigenetic factor [4, 26] also seems quite justified.)

Of course, all of the above can be ignored and only the encouraging results of using both pure DMSO and mixtures containing DMSO in anti-cancer therapy can be taken into account [7, 19, 27 – 30].

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