

Alcohol in Homeopathic Products May Cause Wrong *in vitro* and Local Effects

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In the research of newly discovered drugs and molecules, *in vitro* tests are widely used as an alternative or supplement to animal experiments. However, in tests conducted with water-insoluble substances, the content and density of the substances used as solvents are data that should not be neglected. In cases where solvents (alcohol, etc.) of the tested compound are used, it may cause false *in vitro* results in cytotoxicity tests. Previous *in vitro* tests have shown that alcohol has a cytotoxic effect on cancer cells on its own and that the rates are in the range of (0.4-2%). Homeopathic products may contain different rates of alcohol (approximately 50-60%) during the preparation phase. These rates may decrease during the dilution phase. These drugs have been observed to have very successful results when used systemically. However, it has been seen in the literature that the same drugs (e.g. Thenarecron) have *in vitro* cell culture studies. It has been suggested in these studies that cytotoxic effects are observed and that they can be used as potential cancer drugs. It should not be forgotten that these effects may be due to the alcohol used as a solvent. Other *in vitro* studies have also shown that the mechanism of action of these drugs, which have autophagic effects on cancer cells, is caused by alcohol, not the active ingredients. The systemic effects of these and similar drugs are more valuable in terms of clinical aspects, and local or *in vitro* use may cause misinterpretations. In some *in vitro* studies, it has been observed that the alcohol used in the control group has similar effects on cancer cell lines as drugs with alcoholic extracts. Therefore, it is thought that the use of drugs containing solvents known to have cytotoxic effects (such as alcohol) *in vitro* may cause erroneous evaluations, that if their use is mandatory, one of the control groups must be solvent, and that parenteral (non-local) use on biological systems will be more beneficial.

As a result, it should be kept in mind that systemic use of homeopathic products with alcoholic extracts gives more significant results and that *in vitro* effects such as autophagy and cytotoxicity may be due to their alcohol content.

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