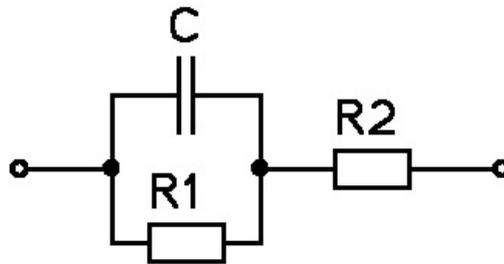


Conduction of electric current through the body

The combination of the ohmic resistance of body fluids and the capacity of cell membranes is primarily responsible for the passive electrical properties of the body.

Model of passive electrical properties

A parallel connection of a capacitor (idealized capacitor) and a resistor, to which another resistor is connected in series, can be used as an electrical model of the passive electrical properties of the tissue:



Model Usage

Since it is difficult to measure the DC resistance of tissues, the impedance is usually measured at different frequencies and the DC resistance is then calculated based on the assumed agreement with the model.

Deviations in the behavior of the model and organism

However, other phenomena are applied in the organism, which sometimes cause significant deviations of the organism's behavior from this model. These phenomena have their cause both in the properties of the organism and in the effects of electric current on the organism.

Among the properties of the organism, the fact that the organism behaves as a conductor II is mainly applied. kind, i.e. that free charge carriers are ions. The passage of direct current therefore causes displacement of mass. In practice, this primarily means that the electrical resistance is not independent of the applied electrical voltage.

Homeostatic mechanisms also act against the movements of the charge, which in practice manifests itself in such a way that when a low direct current passes through the organism, the value of the electrical resistance slowly decreases and usually stabilizes only after a few tens of minutes.

In the case of higher intensities of the flowing current, the effect of the electric current on the organism is applied. In general, the effects of electric current can be divided into thermal and irritating. While the irritating effects decrease with increasing frequency until they completely disappear, thermal effects are present even at relatively high frequencies.

A special case is the passage of electric current at very high frequencies, the so-called skin effect (surface phenomenon). At very high frequencies, the current practically only passes over the surface of the body, and the body can then be connected to a relatively high voltage without the risk of serious consequences.

Links

Related Articles

- Bioimpedance
- Electric shocks
- Effects of electric current on the organism

References

- HRAZDIRA, Ivo. *Medical Biophysics and Instrumentation*. 1. edition. Neptune, 2001. 396 pp. ISBN 80-902896-1-4.