

# Medical PEMF Studies



## Ultrastructural study of hyaluronic acid before and after the use of a pulsed electromagnetic field, electroydesis, in the treatment of wrinkles.



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**BACKGROUND.** Treatment of wrinkles has become an increasing problem for dermatologists. Hyaluronic acid is a component of the family of glycosaminoglycans (GAGS, substances known for their property of retaining water), that significantly decreases with aging and in wrinkles. A new technique that uses a specific pulsed electromagnetic field, electroydesis, has been introduced in the treatment of wrinkles associated with aging. The treatment is based on the reported in vitro effects of specific electromagnetic fields on fibroblast cultures (e.g., an increase in DNA synthesis and in the production of collagen and presumably also of GAGS).

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**METHODS.** The in vivo effects of the electromagnetic field on aged skin (3 subjects aged 50, 56 and 60 years), with particular focus on the ultrastructural modifications and GAGS amount before and after the treatment, were evaluated by electron microscope.

**RESULTS.** The ultrastructural study (tissue stained with alcian blue) showed after treatment a significant increase ( $p < 0.005$ ) of the electron-dense granules (corresponding to hyaluronic acid), located in collagen elastic fibers, and in the soluble matrix. This presumably leads to subsequent edema that was clinically evident after the treatment.

**CONCLUSIONS.** These data suggest that the increased levels of GAGS and the subsequent edema of the dermis could explain at least in part the clinical changes observed after electrolysis treatment (e.g., swelling and “disappearance” of the wrinkle).

