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Ocular Delivery of Charged Drugs Using Iontophoresis

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Abstract : Nearly every eye disorder and treatment of post operated eyes evolve around ocular drug delivery. Most ocular diseases are treated with repeated topical applications administered as eye drops. Various attempts have been made to improve drug bioavailability by increasing both the retention of the drug in the pre-corneal area and the penetration of the drug through the cornea. However, currently marketed products are associated with vision blurring, irritability, patient discomfort, toxicity, low drug bioavailability, manufacturing difficulties and inadequate aqueous stability. It has been suggested to use iontophoresis for the non-invasive delivery of drugs. The iontophoretic device is composed of a control panel, two electrodes, a cylindrical well for the insertion of a disposable hydrogel, and a disposable hydrogel pellet. The drug-loaded hydrogel is attached to a cylindrical well at the edge of the electrode of the device and placed onto the eye. The device applies a variable electrical current that can vary from 0.1 mA to 1.5 mA for pre-set periods from 10 seconds to 300 seconds. The iontophoretic device developed in the lab was found to be effective in the delivery of the drugs: gentamicin, water-soluble steroids, and various anticancer agents. When testing in rabbits for safety, the device was considered to be non-toxic and effective.

Keywords : iontophoresis, eye disorder, drug delivery, hydrogel
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