

眼内薬物投与による網脈絡膜疾患に対する治療の研究

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1995 Fiscal Year Final Research Report Summary

The Toxicity and Pharmacokinetics of Fluoroquinolones

Research Project

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06671755

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Allocation Type

Single-year Grants

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Ophthalmology

Research Institution

Kanazawa University

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levofloxacin / ocular toxicity / melanin / electroretinogram / intraocular penetration / pharmacokinetics / メラニン

Research Abstract

Fluoroquinolones have recently played an important role in treatment of infectious endophthalmitis because of an increase of delay-onset endophthalmitis after cataract surgery and methicillin-resistant *Staphylococcus aureus* infection. Ocular toxicity of fluoroquinolones, however, is concerned from the viewpoint of its melanin-affinity. The ocular tolerance and dynamics of levofloxacin (LVFX), a new fluoroquinolone agent, were studied in the present research.

The effects of LVFX and its isomer (DR-3354) on the retina were evaluated by in-vitro electroretinogram (ERG) in albino rabbits. The ERG was

unchanged during perfusion with 100 and 300μM of levofloxacin, and 100μM of DR-3354. The amplitude of the oscillatory potential was diminished with 300μM of DR-3354 and 500μM of LVFX.

The intraocular penetration of LVFX was studied in albino and pigmented rabbits after oral administration of ¹⁴C-LVFX. The radioactivity of the eyeball of albino rabbits in the autoradiogram was much higher at 1hr than 2 or 6hr after administration. On the other hand, the distribution of radioactivity in pigmented rabbits was similar at 1,2, and 6hr after administration. The LVFX concentration in the melanin-containing tissues such as the iris-ciliary body and the choroid-retina was significantly higher in pigmented rabbits than in albino rabbits after oral administration. These results indicate that the intraocular pharmacokinetics of LVFX are markedly affected by its affinity for melanin.

The effects of intravitreal injection of LVFX on the ERG were studied to establish the non-toxic intravitreal dosage of LVFX. The oscillatory potential transiently deteriorated with 1000 and 2000 μg doses of LVFX in albino and pigmented rabbits. No ERG changes were observed with 200 and 500 μg of LVFX. These results indicate that intravitreal injections of 200 and 500 μg of LVFX are nontoxic to the rabbit retina.

The pharmacokinetics after an intravitreal injection of 500 μg of LVFX were studied in albino and pigmented rabbits. The intravitreal concentration of LVFX was similar in both albino and pigmented rabbits at each measuring point. The LVFX concentration in the melanin-containing tissues such as the iris-ciliary body and the choroid-retina was significantly higher in pigmented rabbits than in albino rabbits after intravitreal injection.

The effects of low-molecular-weight heparin, colchicine and interferon beta on in-vitro ERG were studied in albino rabbits. The ERG were unchanged during perfusion with 5 and 20 IU/ml low-molecular-weight heparin, 25 and 50 μg/ml colchicine or 5000 and 10000 IU/ml interferon beta.

These results indicate that LVFX may be clinically applicable for the treatment of infectious eye disease.▲ Less

Research Products (8 results)

All Other

All Publications (8 results)

[Publications] 望月清文、大久保真司、鳥崎真人、山下陽子、棚橋俊郎、神 義容、岡本裕一、田中 眞: "ウサギにおけるレボフロキサシン単回経口投与後の眼内移行" 日本眼科学会雑誌. 98. 1085-1090 (1994) ▼

[Publications] 望月清文、酒井宏之、鳥崎真人、鈴木俊之、上田満之、田辺譲二: "3種の薬物の眼内灌流液への添加の可能性-白色ウサギ摘出眼杯ERGによる検討-" あたらしい眼科. 11. 1613-1617 (1994) ▼

[Publications] 望月清文、酒井宏之、棚橋俊郎、鳥崎真人、山下陽子、大久保真司: "レボフロキサシンおよびその光学異性体(DR-3354)の白色ウサギ網膜に及ぼす影響" あたらしい眼科. 11. 1775-1778 (1994) ▼

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