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Civerchia

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[54] **COLLAGEN-HYDROGEL FOR PROMOTING EPITHELIAL CELL GROWTH AND REGENERATION OF THE STROMA**

[75] Inventor: **Linda Civerchia**, Ft. Lauderdale, Fla.

[73] Assignee: **CBS Lens, a California general partnership**, Santa Maria, Calif.

[*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 4,983,181.

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Related U.S. Application Data

[60] Continuation of Ser. No. 19,596, Feb. 19, 1993, abandoned, which is a division of Ser. No. 657,091, Feb. 15, 1991, Pat. No. 5,213,720, which is a continuation-in-part of Ser. No. 624,346, Dec. 6, 1990, Pat. No. 5,114,627, which is a division of Ser. No. 402,986, Sep. 1, 1989, Pat. No. 4,983,181, which is a continuation of Ser. No. 920,031, Oct. 6, 1986, abandoned.

[51] **Int. Cl.**[6] **A61F 2/14**; A61F 2/16

[52] **U.S. Cl.** **623/4**; 623/6; 623/11; 424/423; 424/427

[58] **Field of Search** ..... 623/4, 5, 6; 351/160 H, 351/160 R; 522/78, 87; 530/356; 523/105, 106, 113, 114; 264/1.1, 1.7, 2.6, 2.7, 1.36, 1.38; 128/DIG. 8; 424/422, 423, 427, 429

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Primary Examiner—Debra S. Brittingham

Attorney, Agent, or Firm—Daniel J. Meaney, Jr.

[57] **ABSTRACT**

A collagen-hydrogel for promoting epithelial cell growth and regeneration of the stroma is shown. Also shown is an optical lens for the eye, fabricated from the collagen-hydrogel, which, when affixed to Bowman's membrane, promotes and supports epithelial cell growth, enables corneal epithelium of the cornea of an eye, during the healing process, to attach to and cover the anterior surface of the lens implanting the same and to regenerate the stroma which grows over the edge of and attaches to the optical lens. Laid down in the layers of the regenerated stroma are new keratocytes and collagen fibial produced from keratocytes. The collagen-hydrogel is a hydrogel polymer formed by the free radical polymerization of a hydrophilic monomer solution gelled and crosslinked in the presence of an aqueous stock solution of collagen to form a three dimensional polymeric meshwork for anchoring collagen. The collagen-hydrogel material has a ratio by weight of collagen-to-hydrogel in the range of about 0.6-to-1000 and less than 0.6-to-1000 but at a level wherein sufficient collagen is present by weight to at least one of promote epithelial cell growth and regeneration of the stroma to produce keratocytes including collagen fibial growth. The collagen-hydrogel material or an artificial lens or contact lens produced therefrom can include a epithelial growth enhancer to promote epithelial cell growth during the healing process.

14 Claims, 3 Drawing Sheets