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[54] **THREE-DIMENSIONAL LIVER CELL AND TISSUE CULTURE SYSTEM**

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[60] Division of Ser. No. 241,259, May 11, 1994, Pat. No. 5,483,988, which is a continuation-in-part of Ser. No. 131, 361, Oct. 4, 1993, Pat. No. 5,443,950, which is a division of Ser. No. 575,518, Aug. 30, 1990, Pat. No. 5,266,480, which is a division of Ser. No. 402,104, Sep. 1, 1989, Pat. No. 5,032,508, which is a continuation-in-part of Ser. No. 242, 096, Sep. 8, 1988, Pat. No. 4,963,489, which is a continuation-in-part of Ser. No. 38,110, Apr. 14, 1987, abandoned, which is a continuation-in-part of Ser. No. 36,154, Apr. 3, 1987, Pat. No. 4,721,096, which is a continuation of Ser. No. 853,569, Apr. 18, 1986, abandoned.

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[52] **U.S. Cl.** **435/395**; 435/373; 435/402; 435/399; 424/423

[58] **Field of Search** 435/240, 243, 435/284; 424/423

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[57] **ABSTRACT**

The present invention relates to a three-dimensional cell and tissue culture system. In particular, it relates to this culture system for the long term culture of liver cells and tissues in vitro in an environment that more closely approximates that found in vivo. The culture system described herein provides for proliferation and appropriate liver cell maturation to form structures analogous to tissue counterparts in vivo. The resulting liver tissues survivo for prolonged periods, perform liver-specific functions, and maintain hepatic tissue architecture following in vivo implantation. The liver cultures have a variety of applications ranging from transplantation or implantation in vivo, to screening cytotoxic compounds and pharmaceutical compounds in vitro, to the production of biologically active molecules in "bioreactors" and to the construction of extracorporeal liver assist device.

10 Claims, 8 Drawing Sheets