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(12) **United States Patent**  
**Saadat**

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(54) **APPARATUS AND METHODS FOR PERFORMING PERCUTANEOUS MYOCARDIAL REVASCULARIZATION AND STIMULATING ANGIOGENESIS USING AUTOLOGOUS MATERIALS**

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(73) **Assignee:** **Angiotrax, Inc.**, Sunnyvale, CA (US)

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(\* ) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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This patent is subject to a terminal disclaimer.

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(21) **Appl. No.:** **09/428,698**

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(22) **Filed:** **Oct. 27, 1999**

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**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/274,790, filed on Mar. 23, 1999, now Pat. No. 6,102,926, and a continuation-in-part of application No. 09/271,094, filed on Mar. 17, 1999, now Pat. No. 6,120,520.

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(51) **Int. Cl.<sup>7</sup>** ..... **A61B 17/32**

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(52) **U.S. Cl.** ..... **606/170; 600/564**

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(58) **Field of Search** ..... 606/1, 14, 45, 606/46, 108, 159, 170, 171, 180, 564, 565; 128/898

(57) **ABSTRACT**

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Methods are provided for collecting and processing autologous biological materials to form autologous angiogenic agents. Apparatus and methods also are provided for performing percutaneous myocardial revascularization wherein an injection needle is disposed in spaced-apart relation to the channel-forming tool, so that a predetermined amount of the autologous angiogenic agent may be injected into the myocardium adjacent to the PMR channel.

**34 Claims, 4 Drawing Sheets**

