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(54) **METHODS FOR SEALING A VASCULAR PUNCTURE**

(71) Applicant: **Incept, LLC**, Lexington, MA (US)

(72) Inventors: **Amarpreet S. Sawhney**, Lexington, MA (US); **Farhad Khosravi**, Los Altos Hills, CA (US); **Suresh S. Pai**, Los Altos, CA (US)

(73) Assignee: **Incept, LLC**, Lexington, MA (US)

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This patent is subject to a terminal disclaimer.

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(58) **Field of Classification Search**
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See application file for complete search history.

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Primary Examiner — Carlos Azpuru
(74) *Attorney, Agent, or Firm* — Dardi & Herbert, Ph.D.; Curtis B. Herbert

(57) **ABSTRACT**

Apparatus and methods for sealing a puncture communicating with a blood vessel are provided that include introducing a porous carrier formed from lyophilized hydrogel or other material into the puncture. The plug may include at least one of first and second hydrogel precursors and a pH adjusting agent carried by the porous carrier in an unreactive state prior to exposure to an aqueous physiological environment. Once exposed to bodily fluids, the carrier expands as the lyophilized material hydrates to enhance and facilitate rapid hemostasis of the puncture. When the plug is placed into the puncture, the natural wetting of the plug by bodily fluids (e.g., blood) causes the first and second precursors to react and cross-link into an adhesive or "sticky" hydrogel that aids in retaining the plug in place within the puncture.

20 Claims, 14 Drawing Sheets