(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 June 2009 (04.06.2009)

PCT

(10) International Publication Number
WO 2009/067791 A4

(51) International Patent Classification:
A61K 45/00 (2006.01) *A61L 31/06* (2006.01)
A61K 31/765 (2006.01) *A61L 31/14* (2006.01)
A61K 38/39 (2006.01) *A61L 31/16* (2006.01)

(21) International Application Number:
PCT/CA2008/002060

(22) International Filing Date:
26 November 2008 (26.11.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/990,031	26 November 2007 (26.11.2007)	US
61/031,653	26 February 2008 (26.02.2008)	US
61/093,268	29 August 2008 (29.08.2008)	US

(71) Applicant *(for all designated States except US)*: **VIREXX MEDICAL CORP.** [CA/CA]; 8223 Roper Road, Edmonton, Alberta T6E 6S4 (CA).

(71) Applicant *(for US only)*: **HIRSCHE, Bruce** (legal representative of the deceased inventor) [CA/CA]; 1500 Manulife Place, 10180-101 Street, Edmonton, Alberta T5J 4K1 (CA).

(72) Inventor: **NOUJAIM, Antoine** (deceased).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **STEWART, Michael, W.** [CA/CA]; 1127107 Township Road, 510, Spruce Grove, Alberta T7Y 1H6 (CA). **PERSON, Roland, H.** [CA/CA]; 5131 Cedar Creek Court, Kelowna, British Columbia V1W 4J2 (CA). **GRIFFITH, Irwin, J.** [CA/CA]; 11610-75 Avenue, Edmonton, Alberta T6G 0J2 (CA). **TIEGE, Paul, B.** [CA/CA]; 6804-43A Avenue, Edmonton, Alberta T6K 1S8 (CA).

(74) Agent: **PARLEE MCLAWS LLP**; 1500 Manulife Place, 10180-101 Street, Edmonton, Alberta T5J 4K1 (CA).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *with amended claims*

Date of publication of the amended claims: 16 July 2009

(54) Title: COMPOSITIONS AND METHODS FOR PRODUCING VASCULAR OCCLUSION USING A SOLID-PHASE PLATELET BINDING AGENT

(57) Abstract: The present invention relates generally to methods and compositions for targeting and delivering solid-phase platelet-dependent vascular occlusion agents. In particular, particles or coils or stents coated with platelet binding agents are directed to target vasculature, such as the vasculature of solid tumor masses or AV-malformations or aneurysms or endoleaks; the solid-phase agent then binds and activates platelets, which in turn bind and activate other platelets. This process results in the rapid formation of a platelet-mediated thrombus about the solid-phase agent causing vessel occlusion.

WO 2009/067791 A4

AMENDED CLAIMS
received by the International Bureau on 03 June 2009 (03.06.09)

We claim:

1. A method for producing a temporary occlusion at a pre-determined site comprising:

administering a biodegradable solid-phase agent having collagen as a platelet binding agent;

allowing the solid-phase agent to induce thrombus formation; and

allowing the solid-phase agent to degrade.

2. A method for producing a permanent occlusion at a pre-determined site comprising:

administering a biodegradable solid-phase agent having collagen as a platelet binding agent;

allowing the solid-phase agent to induce thrombus formation;

allowing the solid-phase agent to degrade; and

allowing the thrombus to be replaced by connective tissue.

3. A method of treating a disease or condition comprising:

administering a biodegradable solid-phase agent having collagen as a platelet binding agent;

allowing the solid-phase agent to induce thrombus formation;

allowing the solid-phase agent to degrade; and

administering the solid-phase agent at least one more time.

4. A method for treating a disease or condition comprising administering to a mammal a biodegradable solid-phase agent comprising poly(lactic-co-glycolic acid) (PLGA) coated with collagen, and subsequently inducing a thrombus *in vivo* comprising:

capturing platelets by binding the platelets to the collagen immobilized on the solid-phase agent;

inducing activation of the platelets;

allowing a thrombus to form; and

allowing the solid-phase agent to degrade.

5. The method of claims 1-3 wherein the solid-phase agent comprises PLGA.

6. The method of claims 1-3 wherein administering comprises positioning the solid phase agent within the vascular system of a mammal.
7. The method of claims 1-4 wherein the collagen is selected from the group consisting of bovine, human, and ovine.
8. The method of claims 1-7 wherein the solid-phase agent is particulate and of a uniform size.
9. The method of claims 1-7 wherein the solid-phase agent is particulate and of a uniform shape.
10. The method of claims 1-7 wherein the solid-phase agent is of a uniform size and shape.
11. A composition for inducing thrombus formation *in vivo* comprising a biodegradable solid-phase agent having collagen as a platelet binding agent; wherein said composition is delivered to a target vasculature and the platelet binding agent binds platelets onto the solid-phase agent, induces platelet activation, allows a thrombus to form, and then degrades.
12. The use of a biodegradable solid-phase agent comprising a platelet binding agent for treating fibroids, whereby blood flow in a vessel containing the fibroids is temporarily blocked with the biodegradable material, and the vessel becomes unblocked as the solid-phase agent degrades.
13. The use of a biodegradable solid-phase agent comprising a platelet binding agent for any condition or disease for which there is a beneficial effect for having a temporary implant, wherein the solid-phase agent degrades.