

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
10 February 2022 (10.02.2022)



(10) International Publication Number
WO 2022/031760 A1

(51) International Patent Classification:
C12N 15/86 (2006.01)

(21) International Application Number:
PCT/US2021/044416

(22) International Filing Date:
03 August 2021 (03.08.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/061,726 05 August 2020 (05.08.2020) US

(71) Applicant: SPACECRAFT SEVEN, LLC [US/US]; 9
Cedar Brook Drive, Cranbury, New Jersey 08512 (US).

(72) Inventors: HERZOG, Christopher Dean; c/o Spacecraft
Seven, LLC, 9 Cedar Brook Drive, Cranbury, New Jer-
sey 08512 (US). SACRAMENTO, Chester Bittencort; c/
o Spacecraft Seven, LLC, 9 Cedar Brook Drive, Cranbury,
New Jersey 08512 (US). PRABHAKAR, Raj; c/o Space-
craft Seven, LLC, 9 Cedar Brook Drive, Cranbury, New
Jersey 08512 (US). RICKS, David; c/o Spacecraft Seven,
LLC, 9 Cedar Brook Drive, Cranbury, New Jersey 08512
(US).

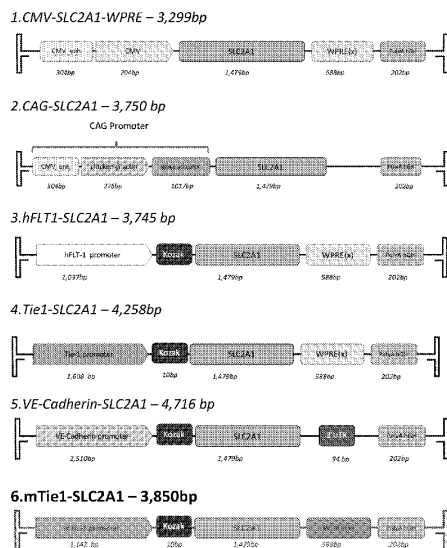
(74) Agent: LAHERTY, Carol D. et al.; Cooley LLP, 1299
Pennsylvania Ave., Suite 700, Washington, District of Co-
lumbia 20004 (US).

(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, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO,
DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN,
KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD,
ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO,
NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW,
SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

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

(54) Title: ADENO-ASSOCIATED VIRAL VECTOR FOR GLUT1 EXPRESSION AND USES THEREOF

FIG. 1



(57) Abstract: Provided herein is a gene therapy for GLUT1 Deficiency Syndrome and related disorders using a recombinant adeno-associated virus (rAAV) virion as a vector to express an GLUT1 protein or functional variant thereof. The rAAV virion may use an endothelial-specific promoter, e.g., a FLT-1 or Tie-1 promoter. The capsid may be an AAV6, AAV8, AAV9, AAVrh.74, or AAVrh.10 capsid or a functional variant thereof. Other promoters or capsids may be used. Further provided are methods of treatment, such as by intracerebrally and/or intravenously of the rAAV virion, and other compositions and methods.

[Continued on next page]

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *with sequence listing part of description (Rule 5.2(a))*