

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

(19) World Intellectual Property
Organization

International Bureau

(43) International Publication Date
10 August 2023 (10.08.2023)



(10) International Publication Number
WO 2023/150689 A3

(51) International Patent Classification:

C07K 14/705 (2006.01) A61K 48/00 (2006.01)
C12N 15/86 (2006.01) C12N 15/864 (2006.01)

(21) International Application Number:

PCT/US2023/061953

(22) International Filing Date:

03 February 2023 (03.02.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/306,941 04 February 2022 (04.02.2022) US
63/306,928 04 February 2022 (04.02.2022) US

(71) Applicants: **DECIBEL THERAPEUTICS, INC.** [US/US]; 1325 Boylston Street, Suite 500, Boston, MA 02215 (US). **REGENERON PHARMACEUTICALS, INC.** [US/US]; 777 Old Saw Mill River Road, Tarrytown, NY 10591 (US).

(72) Inventors: **BURNS, Joseph**; 1325 Boylston Street, Suite 500, Boston, MA 02215 (US). **ELLIS, Kathryn**; 1325 Boylston Street, Suite 500, Boston, MA 02215 (US). **GIBSON, Tyler**; 1325 Boylston Street, Suite 500, Boston, MA 02215 (US). **LEBO, Kevin**; 1325 Boylston St, Suite 500, Boston, MA 02215 (US). **PREGERNIG, Gabriela**; 1325 Boylston St, Suite 500, Boston, MA 02215 (US). **DRUMMOND SAMUELSON, Meghan**; c/o Regeneron Pharmaceuticals, Inc., 777 Old Saw Mill River Road, Tarrytown, NY 10591 (US). **CANCELARICH, Sarah**; c/o Regeneron Pharmaceuticals, Inc., 777 Old Saw Mill River Road, Tarrytown, NY 10591 (US). **SABIN, Leah**; c/o Regeneron Pharmaceuticals, Inc., 777 Old Saw Mill River Road, Tarrytown, NY 10591 (US). **DI BATTISTA MIANI, Daniela**; c/o Regeneron Pharmaceuticals, Inc., 777 Old Saw Mill River Road, Tarrytown, NY 10591 (US).

(74) Agent: **BELLIVEAU, Michael, J.**; Clark & Elbing LLP, 101 Federal Street, 15th Floor, Boston, MA 02110 (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, 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, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, 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, ME, 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).

Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

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))

(88) Date of publication of the international search report:

16 November 2023 (16.11.2023)

(15) Information about Correction:

see Notice of 12 October 2023 (12.10.2023)

(54) Title: GJB2 REGULATORY ELEMENTS AND USES THEREOF

(57) Abstract: The disclosure provides gap junction protein beta 2 (GJB2) promoters and enhancers, as well as vectors containing the same, that can be used to express an expression product in GJB2-expressing cells, including cochlear supporting cells. The GJB2 promoters and enhancers described herein may be operably linked to a polynucleotide, such as a transgene encoding a wild-type form of Gjb2, for treatment of subjects having or at risk of developing hearing loss (e.g., GJB2-related hearing loss).

WO 2023/150689 A3