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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
09 October 2025 (09.10.2025)

WIPO | PCT

(10) International Publication Number
WO 2025/212838 A1

(51) International Patent Classification:
C12N 15/113 (2010.01)

(21) International Application Number:
PCT/US2025/022878

(22) International Filing Date:
03 April 2025 (03.04.2025)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/573,887 03 April 2024 (03.04.2024) US

(71) Applicants: **RESEARCH INSTITUTE AT NATIONWIDE CHILDREN'S HOSPITAL** [US/US]; 700 Children's Drive, Room W172, Columbus, OH 43205 (US). **ARMATUS BIO, INC.** [US/US]; 1275 Kinnear Road, Columbus, OH 43212 (US).

(72) Inventors: **HARPER, Scott, Quenton**; 700 Children's Drive, Columbus, OH 43205 (US). **WALLACE, Lindsay**; 700 Children's Drive, Columbus, OH 43205 (US). **TRIPLETT, Michael**; 18 Wiveliscombe, New Albany, OH 43054 (US). **PRICE, Brian**; 4282 Hickory Rock Drive, Powell, OH 43065 (US).

(74) Agent: **JANULIS, Lynn, L.**; Marshall, Gerstein & Borun LLP, 233 S. Wacker Drive, 6300 Willis Tower, Chicago, IL 60606-6357 (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, MU, 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, UY, 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).

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))*

WO 2025/212838 A1

(54) Title: PRODUCTS AND METHODS FOR TREATING DISEASES OR DISORDERS ASSOCIATED WITH DUX4 OVEREXPRESSION

(57) Abstract: Disclosed herein are products, methods, and uses for treating, ameliorating, delaying the progression of, and/or preventing a muscular dystrophy or a cancer including, but not limited to, facioscapulohumeral muscular dystrophy (FSHD) or a cancer associated with DUX4 expression or overexpression. More particularly, disclosed herein are RNA interference-based products, methods, and uses for inhibiting or downregulating the expression of double homeobox 4 (DUX4). Even more particularly, the disclosure provides microRNA (miRNA) (and vectors and compositions comprising the miRNA encoding polynucleotides) for inhibiting or downregulating the expression of DUX4 and methods of using said miRNA to inhibit or downregulate DUX4 expression in cells and/or in cells of a subject having a muscular dystrophy or a cancer associated with DUX4 expression or overexpression including, but not limited to, FSHD or a cancer associated with DUX4 expression or overexpression.