

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
28 November 2024 (28.11.2024)



(10) International Publication Number
WO 2024/243223 A3

(51) International Patent Classification:

C12N 15/86 (2006.01) A61P 31/18 (2006.01)
A61K 35/761 (2015.01) A61P 31/20 (2006.01)

(21) International Application Number:

PCT/US2024/030392

(22) International Filing Date:

21 May 2024 (21.05.2024)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/503,541 22 May 2023 (22.05.2023) US

(71) Applicant: **FRED HUTCHINSON CANCER CENTER**
[US/US]; 1100 Fairview Avenue North, Seattle, Wash-
ington 98109 (US).

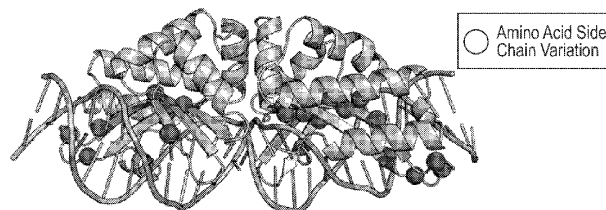
(72) Inventors: **JEROME, Keith R.**; c/o Fred Hutchinson Can-
cer Center, 1100 Fairview Avenue North, Seattle, Washing-
ton 98109 (US). **STODDARD, Barry L.**; c/o Fred Hutchin-

son Cancer Center, 1100 Fairview Avenue North, Seattle,
Washington 98109 (US). **LAMBERT, Abigail R.**; c/o Fred
Hutchinson Cancer Center, 1100 Fairview Avenue North,
Seattle, Washington 98109 (US).

(74) Agent: **BOWMAN, Julie** et al.; Christensen O'Connor
Johnson Kindness PLLC, 1201 Third Avenue, Suite 3600,
Seattle, Washington 98101-3029 (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, UZ, VC, VN, WS,
ZA, ZM, ZW.

(54) Title: TREATMENT OF HSV-2 USING A MEGANUCLEASE



OnuHSV2a Library Design Strategy

```
TTTCCACTTATTCAACCTTTTA wildtype I-OnuI (SEQ ID NO: 41)
TaTCCtTTtTTCTAgTgTTt OnuHSV2a target (SEQ ID NO: 13)
TTTCCACTTtTTCTACCTTTTA OnuHSV2a Lib01 (SEQ ID NO: 15)
TTTCCtTTtTTCAACCTTTTA OnuHSV2a Lib02 (SEQ ID NO: 16)
TTTCCtTTtTTCTACCTTTTA OnuHSV2a Lib03 (SEQ ID NO: 17)
TaTCCtTTtTTCTACCTTTTA OnuHSV2a Lib04 (SEQ ID NO: 18)
TaTCCtTTtTTCTAgCTTTTA OnuHSV2a Lib05 (SEQ ID NO: 19)
TTTCCACTTtTTCAAggTTTTA OnuHSV2a Lib06 (SEQ ID NO: 20)
TaTCCtTTtTTCTAggTTTTA OnuHSV2a Lib07 (SEQ ID NO: 21)
TaTCCtTTtTTCTAggTgTTA OnuHSV2a Lib08 (SEQ ID NO: 22)
TaTCCtTTtTTCTAggTgTTt OnuHSV2a Lib09 (SEQ ID NO: 13)
```

FIG. 1

(57) Abstract: Described herein are compositions and methods for reducing or eliminating latent herpes simplex virus type 2 (HSV-2) from an HSV-2-infected cell, or for reducing or eliminating latent HSV-2 reactivation in an HSV-2-infected cell, leading to a viable curative approach for latent HSV-2 infection. The composition comprises a plurality of viral vectors, wherein the viral vectors comprise a sequence encoding an HSV-2-specific meganuclease. The method comprises delivering to an HSV-2-infected cell a plurality of one or more viral vectors, wherein each of the one or more viral vectors includes a sequence encoding an HSV-2-specific meganuclease.

[Continued on next page]

WO 2024/243223 A3

(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))*
- *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))*
- *with sequence listing part of description (Rule 5.2(a))*

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

30 May 2025 (30.05.2025)