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(71) Applicant: UNIVERSITY OF HAWAII [US/US]; 2425
Campus Road, Sinclair 10, Honolulu, Hawaii 96822 (US).

(72) Inventors: OWENS, Jesse B.; 1350 Ala Moana Boulevard,
Apartment 1209, Honolulu, Hawaii 96814 (US). HEW, Brian;
3527 Edna Street, Honolulu, Hawaii 96815 (US).

(74) Agent: ALTIERI, Stephen L.; Morgan, Lewis & Bock-
ius LLP, 1111 Pennsylvania Avenue, NW, Washington, D.C.
20004 (US).

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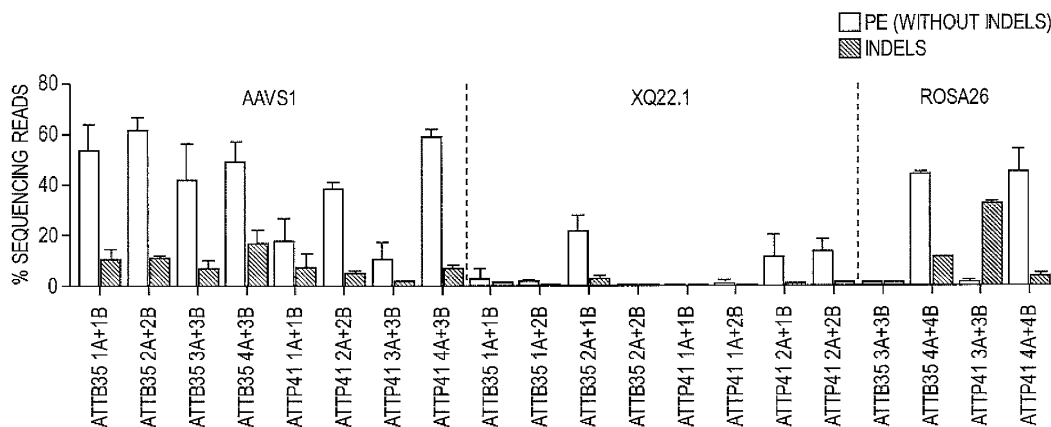


FIG. 1

(57) Abstract: Disclosed are evolved Bxb1 and PhiC31 integrases that exhibit increased insertion activity and efficiency as compared to their wild-type counterparts and use of the evolved integrases to modify any sequence within the genome of a cell or subject.