*NO COVER LETTER

9802237-9

IPOS 3 copy.

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C12N 1/21, A61K 39/116, 39/112, 39/106 — A1

(11) International Publication Number: WO 97/14782

(43) International Publication Date: 24 April 1997 (24.04.97)

(21) International Application Number: PCT/EP96/04334

(22) International Filing Date: 4 October 1996 (04.10.96)

(30) Priority Data:
95116208.0 13 October 1995 (13.10.95) EP
(34) Countries for which the regional or international application was filed: DE et al.

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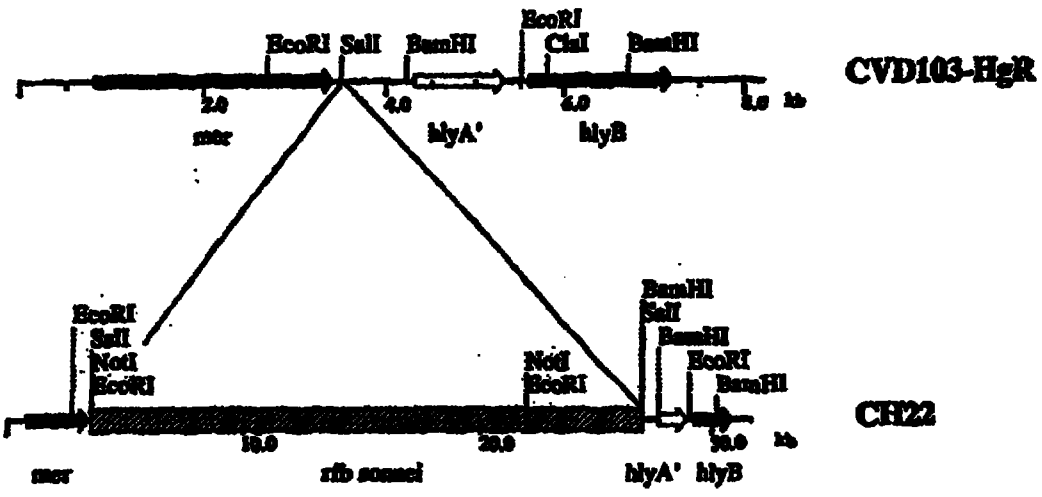
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(81) Designated States: AU, CA, CU, JP, KR, MX, SG, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: LIVE VACCINES AGAINST GRAM-NEGATIVE PATHOGENS, EXPRESSING HETEROLOGOUS O-ANTIGENS



(57) Abstract

The present invention relates to live attenuated gram-negative vaccine carrier strains which are useful for expression and delivery of heterologous O-antigens (O-PS) from gram-negative pathogens. Said strains are deficient in the expression of homologous O-PS due to a defined genetic modification, preferably a deletion, and, thus, capable of efficiently expressing a desired heterologous O-PS in such a way that it is covalently coupled either to homologous or heterologous LPS core lipid A. The present invention furthermore relates to live vaccine carrier strains containing a heterologous gene or a set of heterologous genes encoding O-PS. Preferably, said strains additionally contain genes necessary for the synthesis of complete smooth heterologous LPS. The present invention also relates to live vaccines comprising said strains, preferably for immunization against gram-negative enteric pathogens.