



ABSTRACT

Immunogenic detoxified mutants of cholera toxin and of the
toxin LT, their preparation and their use for the
5 preparation of vaccines

An immunogenic detoxified protein comprising the amino acid
sequence of subunit A of cholera toxin (CT-A) or subunit A
of an *Escherichia coli* heat labile toxin (LT-A) or a
10 fragment thereof wherein one or more amino acids at, or in
positions corresponding to Val-53, Ser-63, Val-97, Tyr-104
or Pro-106 are replaced with another amino acid or deleted.
Examples of specific replacements include Val-53-Asp, Val-
53-Glu, Val-53-Tyr, Ser-63-Lys, Val-97-Lys, Val-97-Tyr, Tyr-
15 104-Lys, Tyr-104-Asp, Tyr-104-Ser, Pro-106-Ser. The
immunogenic detoxified protein is useful as vaccine for
Vibrio cholerae or an enterotoxigenic strain of *Escherichia*
coli and is produced by recombinant DNA means by site-
directed mutagenesis.