**CLAIMS**

1. A non-immunogenic RNA encoding a peptide, said peptide comprising:
a) an oxidoreductase motif;
b) a T-cell epitope of an antigenic protein; and
c) a linker between a) and b) of between 0 and 7 amino acids, preferably of between 0 and 4 amino acids;
wherein said oxidoreductase motif a) comprises the following general structure:
[CST]XXC- or CXX[CST]- (SEQ ID NO: 1 or 2),
wherein X is any amino acid;
wherein [CST] indicates a single serine, threonine or cysteine residue;
wherein the hyphen (-) in said oxidoreductase motif indicates the point of attachment of the oxidoreductase motif to the N-terminal end of the linker or the T cell epitope, or to the C-terminal end of the linker or the T cell epitope.

2. The non-immunogenic RNA of claim 1, wherein the first amino acid of the encoded peptide is a methionine.

3. The non-immunogenic RNA of claim 1 or 2, wherein the non-immunogenic RNA is rendered non-immunogenic by the incorporation of modified nucleotides and the removal of dsRNA.

4. The non-immunogenic RNA of claim 3, wherein the modified nucleotides comprise a replacement of one or more uridines with a nucleoside comprising a modified nucleobase, preferably wherein the modified nucleobase is a modified uracil, more preferably wherein the nucleoside comprising a modified nucleobase is selected from the group consisting of 3-methyl-uridine (m3U), 5-methoxy-uridine (mo5U), 5-aza-uridine, 6-aza-uridine, 2-thio-5-aza-uridine, 2-thio-uridine (s2U), 4-thio-uridine (s4U), 4-thio-pseudouridine, 2-thio-pseudouridine, 5-hydroxy-uridine (ho5U), 5-aminoallyl-uridine, 5-halo-uridine (e.g., 5-iodo-uridineor 5 -bromo-uridine) , uridine 5-oxyacetic acid (cmo5U), uridine 5-oxyacetic acid methyl ester (mcmo5U), 5-carboxymethyl-uridine (cm5U), 1-carboxymethyl-pseudouridine, 5-carboxyhydroxymethyl-uridine (chm5U), 5-carboxyhydroxymethyl-uridine methyl ester (mchm5U), 5-methoxycarbonylmethyl-uridine (mcm5U), 5-methoxycarbonylmethyl-2-thio-uridine (mcm5s2U), 5-aminomethyl-

2-thio-uridine (nm5s2U), 5-methylaminomethyl-uridine (mnm5U), 1-ethyl-pseudouridine, 5- methylaminomethyl-2-thio-uridine (mnm5s2U), 5-methylaminomethyl-2-seleno- uridine (mnm5se2U), 5-carbamoylmethyl-uridine (ncm5U), 5-carboxymethylaminomethyl-uridine (cmnm5U), 5-carboxymethylaminomethyl-2-thio-uridine (cmnm5s2U), 5-propynyl-uridine, 1-propynyl-pseudouridine, 5-taurinomethyl-uridine (τm5U), 1-taurinomethyl-pseudouridine, 5-taurinomethyl-2-thio-uridine (τm5s2U), 1-taurinomethyl-4-thio-pseudouridine, 5-methyl-2-thio-uridine (m5s2U), 1-methyl-4-thio-pseudouridine (m1s4ψ), 4-thio-1-methyl-pseudouridine, 3-methyl-pseudouridine (m3ψ), 2-thio-1-methyl-pseudouridine, 1-methyl-1-deaza-pseudouridine, 2-thio-1-methyl-1-deaza-pseudouridine, dihydrouridine (D), dihydropseudouridine, 5,6-dihydrouridine, 5-methyl-dihydrouridine (m5D), 2-thio-dihydrouridine, 2-thio-dihydropseudouridine, 2-methoxy-uridine, 2-methoxy-4-thio-uridine, 4-methoxy-pseudouridine, 4-methoxy-2-thio-pseudouridine, N(1)-methyl-pseudouridine (m1ψ), 3-(3-amino-3- carboxypropyl)uridine (acp3U), 1-methyl-3-(3-amino-3-carboxypropyl)pseudouridine (acp3 ψ), 5-(isopentenylaminomethyl)uridine (inm5U), 5-(isopentenylaminomethyl)-2-thio-uridine (inm5s2U), α-thio-uridine, 2'-O-methyl-uridine (Um), 5,2'-O-dimethyl-uridine (m5Um), 2'-O-methyl-pseudouridine (ψm), 2-thio-2'-O-methyl-uridine (s2Um), 5-methoxycarbonylmethyl-2'-O-methyl-uridine (mcm5Um), 5-carbamoylmethyl-2'- O-methyl-uridine (ncm5Um), 5-carboxymethylaminomethyl-2'-O-methyl-uridine (cmnm5Um), 3,2'-O-dimethyl-uridine (m3Um), 5-(isopentenylaminomethyl)-2'-O-methyl-uridine (inm5Um), 1-thio-uridine, deoxythymidine, 2'-F-ara-uridine, 2'-F- uridine, 2'-OH-ara-uridine, 5-(2-carbomethoxyvinyl) uridine, and 5-[3-(1-E-propenylamino)uridine, more preferably wherein the nucleoside comprising a modified nucleobase is pseudouridine (ψ), N(1)-methyl-pseudouridine (m1ψ) or 5-methyl-uridine (m5U), most preferably wherein the nucleoside comprising a modified nucleobase is N(1)-methyl-pseudouridine (m1ψ).

5. The non-immunogenic RNA of any one of claims 1 to 4, wherein the non-immunogenic RNA is formulated in a delivery vehicle, preferably wherein the delivery vehicle comprises particles, a lipid, or a cationic lipid, preferably wherein the delivery vehicle comprises a lipid that forms a complex with and/or encapsulates the non-immunogenic RNA, or wherein the non-immunogenic RNA is formulated in liposomes.

6. The non-immunogenic RNA of any one of claims 1 to 5, wherein said oxidoreductase motif comprises a sequence defined by any one of SEQ ID NOs: 24 to 35.

7. The non-immunogenic RNA of any one of claims 1 to 6, encoding an immunogenic peptide that has a length of between 9 and 50 amino acids, preferably of between 9 and 30 amino acids.

8. The non-immunogenic RNA of any one of claims 1 to 7, wherein the oxidoreductase motif in said immunogenic peptide does not naturally occur in the amino acid sequence within a region of 11 amino acids N-terminally or C-terminally of the T-cell epitope in said antigenic protein and/or wherein said the T-cell epitope does not naturally comprise said oxidoreductase motif in its amino acid sequence.

9. The non-immunogenic RNA according to any one of claims 1 to 8, wherein said T cell epitope is an MHC class II T cell epitope having a length of between 7 and 25 amino acids, preferably between 9 and 25 amino acids; or wherein said T cell epitope in the peptide is an NKT cell epitope having a length of between 7 and 25 amino acids.

10. A pharmaceutical composition comprising the non-immunogenic RNA according to any one of claims 1 to 9 and optionally a pharmaceutically acceptable excipient.

11. Use of the non-immunogenic RNA according to any one of claims 1 to 9 or the pharmaceutical composition according to claim 10 in the manufacture of a medicament for treating or preventing a disease or condition selected from: an autoimmune disease, an infection with an intracellular pathogen, a tumor, an allograft rejection, or an immune response to a soluble allofactor, to an allergen exposure or to a viral vector used for gene therapy or gene vaccination in a subject.

12. Use of the non-immunogenic RNA according to any one of claims 1 to 9 or the pharmaceutical composition according to claim 10 in the manufacture of a medicament for inducing cytolytic CD4+ T cells in a subject.

13. The use according to claims 11 or 12, wherein the subject has an autoimmune disease, preferably wherein the autoimmune disease is selected from the group

comprising: type-1 diabetes (T1D), a demyelinating disorder such as multiple sclerosis (MS) or neuromyelitis optica (NMO), or in rheumatoid arthritis (RA).

14. The use according to claim 13, wherein the antigenic protein is selected from the group consisting of: (pro)insulin, GAD65, GAD67, IA-2 (ICA512), IA-2 (beta/phogrin), IGRP, Chromogranin, ZnT8 and HSP-60, and wherein said autoimmune disease is type-1 diabetes (T1D).

15. The use according to claim 13, wherein the antigenic protein is selected from the group consisting of: Myelin oligodendrocyte glycoprotein (MOG), Myelin basic protein (MBP), Proteolipid protein (PLP), Myelin-oligodendrocytic basic protein (MOBP), and Oligodendrocyte-specific protein (OSP), and wherein said autoimmune disease is multiple sclerosis (MS), and/or neuromyelitis optica (NMO).

16. The use according to claim 13, wherein the antigenic protein is selected from the group consisting of: GRP78, HSP60, 60 kDa chaperonin 2, Gelsolin, Chitinase-3-like protein 1, Cathepsin S, Serum albumin, and Cathepsin D, and wherein said autoimmune disease is rheumatoid arthritis (RA).

17. The use according to claims 11 or 12, wherein the antigenic protein is a tumor or cancer antigen such as: an oncogene, proto-oncogene, viral protein, surviving factor or clonotypic or idiotypic determinant, wherein said disease is cancer.

18. The use according to claim 15, wherein the non-immunogenic RNA encodes a peptide comprising a T-cell epitope of MOG, more preferably an MHC class II T cell epitope YRSPFSRVV (SEQ ID NO: 704), FLRVPCWKI (SEQ ID NO: 4) or FLRVPSWKI (SEQ ID NO: 5).

19. The use according to claim 15, wherein the peptide encoded by said non-immunogenic RNA is defined by SEQ ID NO. 777, or 778, or 707.

20. The method according to claim 14, wherein said non-immunogenic RNA encodes a peptide comprising a T-cell epitope of insulin, preferably comprising the MHC class II T cell epitope LALEGSLQK (SEQ ID NO: 3).