Claims

[Claim 1]
An alphavirus replicon vector comprising, a polynucleotide which encodes alphavirus non-structural proteins nsp1, nsp2, nsp3 and nsp4, and a polypeptide comprising an interleukin.

[Claim 2]
The alphavirus replicon vector of claim 1, wherein the interleukin is interleukin-12 (IL-12).

[Claim 3]
The alphavirus replicon vector of claim 1 or 2, wherein the interleukin is fused to a transmembrane domain.

[Claim 4]
The alphavirus replicon vector of claim 3, wherein the transmembrane domain is derived from Influenza Hemagglutinin (HA) or TLR4.

[Claim 5]
The alphavirus replicon vector of claim 3 or 4, wherein the transmembrane domain is fused to the interleukin by a linker.

[Claim 6]
The alphavirus replicon vector of claim 5, wherein the linker is IgG4CH3.

[Claim 7]
The alphavirus replicon vector of any one of claims 1-6, which comprises a promoter, 5' UTR, polynucleotide encoding alphavirus non-structural proteins nsp1, nsp2, nsp3 and nsp4, SG promoter, a gene of interest encoding the polypeptide comprising an interleukin, 3'UTR and poly A tail.

[Claim 8]
The alphavirus replicon vector of any one of claims 1-7, wherein the polypeptide comprising an interleukin has the amino acid sequence of SEQ ID NO: 14 or 18.

[Claim 9]
The alphavirus replicon vector of any one of claims 1-8, wherein the alphavirus is a CHIKV or VEEV.

[Claim 10]
The alphavirus replicon vector of claims 9, wherein the CHIKV is CHIKV strain 37997 or strain OPY-1.

[Claim 11]
The alphavirus replicon vector of claims 9, wherein the VEEV is VEEV strain TC-83.

[Claim 12]
A composition comprising
(i) a pharmaceutically acceptable carrier, and
(ii) a vector of any one of claims 1-11.

[Claim 13]
The composition of claim 12, wherein the pharmaceutically acceptable carrier is a delivery vehicle and the alphavirus replicon vector is encapsulated in the delivery vehicle.

[Claim 14]
The composition of claim 13, wherein the delivery vehicle is a particle consisting of alphavirus structural proteins or a lipid delivery system.

[Claim 15]
A composition comprising a lipid nanoparticle and the alphavirus replicon vector of any one of claims 1-11, wherein the alphavirus replicon vector is encapsulated in the lipid nanoparticle.

[Claim 16]
A vaccine comprising the alphavirus replicon vector or composition according to any one of Claims 1-15.

[Claim 17]

Use of the alphavirus replicon vector, composition or vaccine of any one of claims 1-16 for the manufacture of a medicament for treating and/or immunizing against cancer or inflammatory disease.

[Claim 18]
The use of claim 17, wherein the cancer or inflammatory disease comprises colon cancer and melanoma.

[Claim 19]
The alphavirus replicon vector, composition or vaccine of any one of claims 1-16 for use in treating and/or immunizing against cancer or inflammatory disease.

[Claim 20]
The alphavirus replicon vector, composition or vaccine of any one of claims 1-16 for use in therapy.