CLAIMS

1. An adjuvant that comprises nanoparticles formed by the dispersion of hydrophobic proteins of the outer membrane complex of bacterium *Neisseria meningitidis* in a solution and fully synthetic variants of GM3 ganglioside wherein the fatty acid in the ceramide of the GM3 ganglioside selected from the group consisting:

-stearic acid (18:0) and

oleic acid (18:1).

2. A vaccine composition that comprises one any of the nano-particulated adjuvants of claim 1and any antigen selected from the group comprising:

- the growth factor receptors are HER1, HER2, HER3 alone or in combination and

-PyrGnRHm1-TT peptide.

3. The vaccine composition of claim 2 which comprises another adjuvant selected from the group comprising:

- alum; and

- an oily adjuvant.

4. Use of the vaccine composition according to any one of claims 2-3 in the manufacture of a medicament for the treatment of HER1, HER2, HER3 and/or PyrGnRHm1-TT peptide expressing cancer.

5. Use of the adjuvant according to claim 1 wherein the fatty acid is stearic acid (18:0) to stimulate the antigen-specific humoral immune response.

6. Use of the adjuvant according to claim 1 wherein the fatty acid is oleic acid (18:1) to stimulate the antigen-specific cellular immune response.

7. Use of the adjuvants according to claim 1 to optimize the antigen specific humoral and cellular immune response in a patient, wherein the adjuvants consist of:

-nanoparticles formed by the dispersion of hydrophobic proteins of the outer membrane complex of the bacterium Neisseria meningitidis in a solution and fully synthetic variants of GM3 ganglioside wherein the fatty acid in the ceramide of the GM3 ganglioside is stearic acid (18:0) and

-nanoparticles formed by the dispersion of hydrophobic proteins of the outer membrane complex of the bacterium Neisseria meningitidis in a solution and fully synthetic variants of GM3 ganglioside wherein the fatty acid in the ceramide of the GM3 ganglioside is oleic acid (18:1).

8. The vaccine composition for use according to of any one of claims 2-4 in a subject in need thereof, comprising administration by subcutaneously, intradermally, intramuscularly, intranodally, intratumorally or by direct application to mucous membranes of the vaccine compositions every 15 days for at least a total of five induction doses and subsequently in monthly maintenance doses for at least six months.

9. The vaccine composition for use according to claim 8 wherein the vaccine compositions are administered simultaneously, staggered or alternately.