CLAIMS

1. An adjuvant that comprises nanoparticles formed by association of GM3 ganglioside comprising a synthetic fatty acid to hydrophobic proteins of outer membrane complex of bacterium *Neisseria meningitidis*.

2. The adjuvant according to claim 1 wherein the fatty acid in ceramide of the GM3 ganglioside is stearic acid (18:0).

3. The adjuvant according to claim 1 wherein the fatty acid in ceramide of the GM3 ganglioside is oleic acid (18:1).

4. The adjuvant according to claim 1 wherein the fatty acid in ceramide of the GM3 ganglioside is nervonic acid (24:1).

5. The adjuvant according to claim 1 wherein the fatty acid in ceramide of the GM3 ganglioside is lignoceric acid (24:0).

6. A vaccine composition that comprises one of the nano-particulated adjuvants of any of claims 1-5 and peptides, polypeptides or proteins as antigen.

7. The vaccine composition of claim 6 which optionally comprises another adjuvant selected from the group comprising:

- alum; and
- an oily adjuvant.

8. The vaccine composition of claims 6-7 wherein the antigen is the extracellular domains of growth factor receptors or portions thereof.

9. The vaccine composition of claims 6-8 wherein the growth factor receptors are HER1, HER2, HER3 alone or in combination.

10. The vaccine composition of claims 6-8 wherein the antigen is GnRHm1-TT peptide.

11. The vaccine composition according to claims 6-10 for use in treatment of cancer.

12. The vaccine composition according to claims 6-10 for use in the treatment of chronic viral infections with oncogenic viruses.

13. The adjuvant according to claim 2 for use to stimulate the antigen-specific humoral immune response.

14. The adjuvant according to any of the claims 3-5 for use to stimulate the antigen-specific cellular immune response.

15. The combination of the adjuvants of claims 2 and any of the claims 3 to 5 for use to optimize the antigen-specific humoral and cellular immune response in a patient.

16. The vaccine composition of any the claims 6-10 wherein the composition is administered by subcutaneous, intradermal, intramuscular, intranodal, intratumoral routes or by direct application to mucous membranes of the vaccine compositions of claims every 15 days for at least a total of five induction doses and subsequently in monthly maintenance doses for at least six months.

17. The vaccine composition according to claim 16 wherein the administration of the vaccines is simultaneously, staggered or alternately.