CLAIMS

1. A composition comprising bacteria selected from the group consisting of *Enterococcus hirae, Lactobacillus johnsonii* and mixtures thereof, for use as an adjuvant to an antineoplastic treatment administered to a cancer patient.

2. The composition of claim 1, for the use of claim 1, wherein said composition further comprises bacteria selected from the group consisting of segmented filamentous bacteria (SFB), *Porphyromonas*, *Barnesiella*, *Holdemania* and mixtures thereof.

3. The composition of claim 1 or claim 2, for the use of claim 1, wherein said composition comprises *Enterococcus hirae* and at least one strain selected from the group consisting of *Porphyromonas*, *Barnesiella* and *Holdemania.*

4. The composition of claim 3, for the use of claim 1, wherein said composition further comprises *Lactobacillus johnsonii* strain.

5. The composition of any of claims 1 to 4, for the use of claim 1, wherein said *Enterococococcus hirae* strain is the strain deposited on November 7, 2013 at the Collection Nationale de Cultures de Microorganismes (CNCM), under the number
I-4815.

6. The composition of any of claims 1 to 5, for the use of claim 1, wherein said probiotic composition is formulated for oral administration.

7. The composition of any of claims 1 to 6, for the use of claim 1, wherein said probiotic composition is administered to a patient in need thereof after the administration of the antineoplastic treatment.

8. The composition of any of claims 1 to 6, for the use of claim 1 or claim 7, wherein said antineoplastic treatment is a treatment with a chemotherapeutic agent.

9. The composition of any of claims 1 to 6, for the use of claim 1 or claim 7, wherein said antineoplastic treatment is an anticancer vaccine with a chemotherapeutic agent as a vaccine adjuvant.

10. The composition of any of claims 1 to 6, for the use of claim 7 or claim 8, wherein said chemotherapeutic agent is cyclophosphamide (CTX).

11. The composition of any of claims 1 to 5, for the use of any of claims 1 and 7 to 10, wherein said patient has a dysbiosis with an under-representation of species present in said probiotic composition.

12. The composition of any of claims 1 to 6, for the use of any of claims 1 and 7 to 11, wherein said probiotic composition is administered to a patient in need thereof after the administration of a broad-spectrum antibiotic treatment.

13. An immunogenic composition comprising fragments of bacteria selected from the group consisting of *Enterococcus hirae, Lactobacillus johnsonii, Enterococcus faecalis* and mixtures thereof, for use as an adjuvant to an antineoplastic treatment administered to a cancer patient.

14. The immunogenic composition of claim 13, for the use of claim 13, wherein said composition further comprises fragments of segmented filamentous bacteria (SFB), *Porphyromonas*, *Barnesiella*, *Holdemania* and mixtures thereof.

15. The immunogenic composition of claim 13 or claim 14, for the use of claim 13, wherein said composition comprises fragments of *Enterococcus hirae* and fragments of at least one strain selected from the group consisting of *Porphyromonas*, *Barnesiella* and *Holdemania.*

16. The immunogenic composition of any of claims 13 to 15, for the use of claim 13, wherein said *Enterocococcus hirae* strain is the strain deposited on November 7, 2013 at the Collection Nationale de Cultures de Microorganismes (CNCM), under the number I-4815.

17. The immunogenic composition of any of claims 13 to 16, for the use of claim 13, wherein said composition is formulated for subcutaneous or intramuscular administration.