1. Hodi et al. The New England journal of medicine 363, 711-723 (2010).
2. Hamid et al. The New England journal of medicine 369, 134-144 (2013).
3. Tumeh et al. Nature 515, 568-571 (2014).
4. Spranger et al. Science translational medicine 5, 200ra116 (2013).
5. Ji et al. Cancer immunology, immunotherapy: CII 61, 1019-1031 (2012).
6. Gajewski et al. Cancer journal 16, 399-403 (2010).
7. Mazmanian et al. Cell 122, 107-118 (2005).
8. Round et al. Proceedings of the National Academy of Sciences of the United States of America 107, 12204-12209 (2010).
9. Ivanov et al. Cell 139, 485-498 (2009).
10. Wu et al. Immunity 32, 815-827 (2010).
11. Goto et al. Immunity 40, 594-607 (2014).
12. Ganal et al. Immunity 37, 171-186 (2012).
13. Abt et al. Immunity 37, 158-170 (2012).
14. Iida et al. Science (New York, N.Y.) 342, 967-970 (2013).
15. Viaud et al. Science (New York, N.Y.) 342, 971-976 (2013).
16. Lopez et al. International journal of food microbiology 138, 157-165 (2010).
17. Ménard et al. Applied and Environmental Microbiology 74, 660-666 (2008).
18. Dong et al. Early human development 86, 51-58 (2010).
19. Mackey et al. Journal of immunology (Baltimore, Md.: 1950) 161, 2094-2098 (1998).
20. Scholer et al. Immunity 28, 258-270 (2008).
21. Bak et al. Journal of immunology (Baltimore, Md.: 1950) 189, 1708-1716 (2012).
22. Pan et al. Immunology letters 94, 141-151 (2004).
23. Pettit et al. Journal of immunology (Baltimore, Md.: 1950) 159, 3681-3691 (1997).
24. Compeer et al. Frontiers in Immunology 3, (2012).
25. Jancic et al. Nature cell biology 9, 367-378 (2007).
26. Stober et al. Infection and Immunity 75, 5059-5067 (2007).
27. Kabashima et al. The American Journal of Pathology 171, 1249-1257 (2007).
28. Nukiwa et al. European journal of immunology 36, 1019-1027 (2006).
29. Zhang et al. New England Journal of Medicine 348, 203-213 (2003).
30. Fuertes et al. The Journal of experimental medicine 208, 2005-2016 (2011).
31. Woo et al. Immunity 41, 830-842 10.
32. Blank et al. Cancer research 64, 1140-1145 (2004).
33. Caporaso et al. Bioinformatics 26, 266-267 (2010).
34. McDonald et al. The ISME journal 6, 610-618 (2012).
35. Caporaso et al. Nat Meth 7, 335-336 (2010).
36. Wang et al. Appl Environ Microbiol 73, 5261-5267 (2007).
37. Lozupone et al. Appl Environ Microbiol 71, 8228-8235 (2005).

We claim:

1. A method of treating cancer in a human subject comprising co-administering to the subject an immune checkpoint inhibitor and a bacterial formulation comprising bacteria of the genus *Bifidobacterium*.

2. The method of claim **1**, wherein at least 50% of the bacteria in the bacterial formulation are of the genus *Bifidobacterium*.

3. The method of claim **1**, wherein at least 90% of the bacteria in the bacterial formulation are of the genus *Bifidobacterium*.

4. The method of claim **1**, wherein the bacteria of the genus *Bifidobacterium* comprise bacteria of the species *Bifidobacterium lactis, Bifidobacterium bifidium, Bifidobacterium longum, Bifidobacterium animalis, Bifidobacterium breve, Bifidobacterium infantis, Bifidobacterium catenulatum, Bifidobacterium pseudocatenulatum, Bifidobacterium adolescentis, Bifidobacterium angulatum, Bifidobacterium asteroides, Bifidobacterium boum, Bifidobacterium choerinum, Bifidobacterium coryneforme, Bifidobacterium cuniculi, Bifidobacterium denticolens, Bifidobacterium dentium, Bifidobacterium gallicum, Bifidobacterium gallinarum, Bifidobacterium indicum, Bifidobacterium inopinatum, Bifidobacterium magnum, Bifidobacterium merycicum, Bifidobacterium minimum, Bifidobacterium pseudolongum, Bifidobacterium pullorum, Bifidobacterium psychraerophilum, Bifidobacterium ruminantium, Bifidobacterium saeculare, Bifidobacterium scardovii, Bifidobacterium simiae, Bifidobacterium subtile, Bifidobacterium therammcidophilum, Bifidobacterium thermophilum, Bifidobacterium tsurumiense, Bifidobacterium urinalis* or *Bifidobacterium* sp.

5. The method of claim **1**, wherein the bacterial formulation is administered by oral administration or rectal administration.

6. The method of claim **5**, wherein the bacterial formulation is administered by oral administration.

7. The method of claim **1**, wherein the bacterial formulation comprises at least 5×10^6 CFU of bacteria of the genus *Bifidobacterium*.

8. The method of claim **1**, wherein the bacterial formulation is administered to the subject in two or more doses.

9. The method of claim **8**, wherein the administration of the two or more doses are separated by at least 1 week.

10. The method of claim **1**, further comprising administering to the subject an antibiotic prior to the administration of the bacterial formulation.

11. The method of claim **10**, wherein the antibiotic is administered to the subject at least 1 day before the bacterial formulation is administered to the subject.

12. The method of claim **1**, wherein the immune checkpoint inhibitor is a protein or polypeptide that binds to an immune checkpoint protein.

13. The method of claim **12**, wherein the immune checkpoint protein is CTLA4, PD-1, PD-L1, PD-L2, A2AR, B7-H3, B7-H4, BTLA, KIR, LAG3, TIM-3 or VISTA.

14. The method of claim **13**, wherein the immune checkpoint protein is PD-1 or PD-L1.

15. The method of claim **1**, wherein the immune checkpoint inhibitor is an antibody or antigen binding fragment thereof that binds to an immune checkpoint protein.

16. The method of claim **15**, wherein the immune checkpoint protein is CTLA4, PD-1, PD-L1, PD-L2, A2AR, B7-H3, B7-H4, BTLA, KIR, LAG3, TIM-3 or VISTA.

17. The method of claim **16**, wherein the immune checkpoint protein is PD-1 or PD-L1.

18. The method of claim **1**, wherein the immune checkpoint inhibitor is nivolumab, pembrolizumab, pidilizumab, AMP-224, AMP-514, STI-A1110, TSR-042, RG-7446, BMS-936559, BMS-936558, MK-3475, CT O11, MPDL3280A, MEDI-4736, MSB-0020718C, AUR-012 and STI-A1010.

19. The method of claim **1**, wherein the immune checkpoint inhibitor is administered by intravenous injection, intramuscular injection, intratumoral injection or subcutaneous injection.