hemorrhage. Increases in white blood cells, neutrophils and lymphocytes, lead to a decrease in infectious complications.

[0013a] In one aspect, the invention relates to the use of a pharmaceutical composition in the manufacture of a medicament for increasing survival in a subject with cancer, wherein the composition comprises a therapeutically effective amount of IL-12, and wherein the pharmaceutical composition is to be administered in a therapeutically effective amount to a subject receiving a predetermined chemotherapy and/or chemoradiotherapy regimen, wherein the administration of IL-12 reduces the likelihood and/or severity of occurrence of at least two cytopenias inducible by chemotherapy and/or chemoradiotherapy, wherein the need for subsequent adjustment of the chemotherapy and/or chemoradiotherapy dose regimen resulting from the induction of cytopenia is mitigated.

[0013b] In another aspect, there is provided the use of a pharmaceutical composition comprising substantially isolated IL-12 in the manufacture of a medicament for the treatment or prevention of chemotherapy-induced cytopenias in a subject following exposure of the subject to chemotherapeutic agents, wherein administration of a therapeutically effective amount of the pharmaceutical composition results in diminished chemotherapy-induced cytopenias.

[0014] The inventions described and claimed herein have many attributes and embodiments including, but not limited to, those set forth or described or referenced in this Brief Summary. It is not intended to be all-inclusive and the inventions described and claimed herein are not limited to or by the features or embodiments identified in this Brief Summary, which is included for purposes of illustration only and not restriction. Additional embodiments may be disclosed in the Detailed Description below.

BRIEF DESCRIPTION OF THE FIGURES

[0015] Figure 1 A-B: Blood Recovery Profiles for Vehicle and rMuIL-12 Administered Before and After Myelosuppresive Radiation (625 rad). Blood cell recovery profiles are shown for the EL4 lymphoma tumor model (a) and the Lewis lung cancer model (b) for neutrophils, red blood cells and platelets. Pre-radiation blood values reflect an average of all animals in both groups before radiation and tumor inoculation. The normal threshold value for murine blood cell counts is indicated by the dashed line. During days 14-21 in both tumor models, rMuIL-12—treated mice showed statistically significant improvements in blood cell counts as

compared to the vehicle control ($P < .001$ for days 14 and 18 and $P < .01$ at day 21; ANOVA followed by Tukey tests).

[0016] **Figure 2 A-B**: Relative Changes in Tumor Volumes for Vehicle and rMuIL-12 Treatment Groups Following Radiation (625 rad). Changes in tumor volumes over the course of the experiment are shown for the EL4 lymphoma tumor model (a) and the Lewis Lung cancer tumor model (b). Mice in both tumor models were given 625 rad on day 1. Mice in both tumor models were given a second dose of radiation on day 22 following the initial radiation dose. In the EL4 lymphoma model, all rMuIL-12 treatment groups, namely pre, post and pre-post radiation dosing groups, significantly reduced tumor growth (%T/C < 50%) as compared with the control at the endpoint of tumor volume evaluation. In the Lewis lung cancer model, rMuIL-12 post-treatment significantly reduced tumor growth (%T/C < 50%) at the endpoint of tumor growth evaluation.

[0017] **Figure 3**: Kaplan-Meier Survival Curves of Irradiated, Unsupported Monkeys Treated with HemaMax™. Pooled HemaMax™ dosing group is shown. No antibiotics were

WHAT IS CLAIMED IS:

1. Use of a pharmaceutical composition in the manufacture of a medicament for increasing survival in a subject with cancer, wherein the composition comprises a therapeutically effective amount of IL-12, and wherein:

the pharmaceutical composition is to be administered in a therapeutically effective amount to a subject receiving a predetermined chemotherapy and/or chemoradiotherapy regimen, wherein the administration of IL-12 reduces the likelihood and/or severity of occurrence of at least two cytopenias inducible by chemotherapy and/or chemoradiotherapy,

wherein the need for subsequent adjustment of the chemotherapy and/or chemoradiotherapy dose regimen resulting from the induction of cytopenia is mitigated.

2. The use of claim 1, wherein the chemotherapy and/or chemoradiotherapy dose regimen adjustment includes modification of dose amount and frequency of administration, including dose fraction/ dose titration and/or dose reduction.

3. The use of claim 1 or 2, wherein the administration of IL-12 induces anti-tumor responses.

4. The use of any one of claims 1-3, wherein the combined modality of the IL-12 administration with chemotherapy and/or chemoradiotherapy results in an increase in the survival of the subject.

5. The use of claim 4, wherein the survival is progression-free survival.

6. The use of claim 4, wherein the survival is the overall survival of the subject.

7. The use of any one of claims 1-6, wherein the cytopenias include lymphopenia.

8. The use of any one of claims 1-7, wherein the cytopenias are selected from at least two of neutropenia, leucopenia, anemia, thrombocytopenia, and lymphopenia.

9. The use of any one of claims 1-8, wherein the cytopenias include neutropenia.

10. The use of claim 7 or 8, wherein the lymphopenia includes at least one of lymphocyte subsets comprising CD4+, CD8+, CD8+memory cells, and NK cells.

11. Use of a pharmaceutical composition comprising substantially isolated IL-12 in the manufacture of a medicament for the treatment or prevention of chemotherapy-induced cytopenias in a subject following exposure of the subject to chemotherapeutic agents, wherein administration of a therapeutically effective amount of the pharmaceutical composition results in diminished chemotherapy-induced cytopenias.

12. The use of claim 11, wherein the chemotherapeutic agent is to be administered to the subject as a combined modality in combination with exposure to a dose of radiation.

13. The use of claim 11 or 12, wherein the pharmaceutically effective dose of IL-12 is less than about 300 ng/kg.

14. The use of claim 11 or 12, wherein the pharmaceutically effective dose of IL-12 is two or more doses of less than about 300 ng/kg for each dose.

15. The useof claim 11 or 12, wherein the one or more pharmaceutically effective dose(s) of IL-12 is less than about 200 ng/kg.

16. The use of claim 11 or 12, wherein the one or more pharmaceutically effective dose(s) of IL-12 is less than about 100 ng/kg.

17. The use of any one of claims 11-16, wherein the one or more pharmaceutically effective dose(s) of IL- I 2 are given before chemotherapeutic agent exposure.

18. The use of any one of claims 11-16, wherein the one or more pharmaceutically effective dose(s) of IL-12 are given before and after chemotherapeutic agent exposure.

19. The use of any one of claims 11-16, wherein the one or more pharmaceutically effective dose(s) of IL-12 are given after chemotherapeutic agent exposure.

20. The use of any one of claims 11-19, wherein the IL-12 is a rHuIL-12.

21. The use of any one of claims 11-20, wherein the chemotherapeutic agent is a platinum-based chemotherapy.