WHAT IS CLAIMED IS:

1. Use of an expanded CD3-depleted HLA-haploidentical or mismatched NK cell fraction, obinutuzumab, IL-2 and at least one chemotherapeutic immunosuppressive agent in the manufacture of a medicament for combination therapy of a hematological disease in a subject in need thereof, wherein:

(i) said expanded CD3-depleted HLA-haploidentical or mismatched NK cell fraction is an expanded cell fraction *ex-vivo* cultured with nutrients, serum, IL-15 and nicotinamide in an amount between 1.0 mM to 10 mM and harvested in a first portion after 14 days of culture and a second portion after 16 days of culture;

(ii) said first portion comprises about 50% of the expanded CD3-depleted NK cell fraction and the second portion comprises the remainder of the expanded CD3-depleted NK cell fraction,

(iii) said first and second portions are provided for administration no more than 10 hours following final product release

(iv) wherein said IL-2 is to be administered on the day of the administration of the expanded CD3-depleted NK cell fraction, two days after administration of the expanded CD3-depleted NK cell fraction, and four days after expanded CD3-depleted NK cell fraction, and

(v) said obinutuzumab is to be administered twice before administration of said expanded NK cell fraction and once after administration of said expanded NK cell fraction,

and wherein said hematological disease is a CD20-positive hematological malignancy.

2. The use of claim 1, wherein said subject and said NK cell fraction are a human subject and a human NK cell fraction.

3. The use of any one of claims 1 or 2, wherein said subject has been treated with irradiation.

4. The use of any one of claims 1-3, wherein said CD-positive hematological malignancy is a CD20-positive lymphoid malignancy.

5. The use of any one of claims 1-3, wherein said hematological disease is a CD20-positive multiple myeloma.

6. The use of any one of claims 1-3, wherein said hematological disease is CD20-positive non-Hodgkins lymphoma (NHL).

7. The use of claim 6, wherein said NHL is a CD20-positive B cell NHL.

8. The use of claim 1, wherein the combined said first and said second portions comprise $2X10^7$/kg to $2X10^8$/kg total expanded CD3-depleted HLA-haploidentical or mismatched NK cells.

9. The use of any one of claims 1-8, wherein:

(a) said first portion and said second portion of said NK cell fraction each comprise $1X10^7$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells, for a total dose of $2X10^7$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells, or

(b) said first portion and said second portion of said NK cell fraction each comprise $5X10^7$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells, for a total dose of $1X10^8$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells, or

(c) said first portion and said second portion of said NK cell fraction each comprise $1X10^8$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells, for a total dose of $2X10^8$/kg expanded CD3-depleted HLA-haploidentical or mismatched NK cells.

10. The use of any one of claims 1-9, wherein said at least one chemotherapeutic immunosuppressive agent comprises cyclophosphamide and/or fludarabine.

11. The use of claim 10, wherein said at least one chemotherapeutic immunosuppressive agent comprises both cyclophosphamide (40 mg/kg) and fludarabine (25 mg/m^2).

12. The use of any one of claims 1-11, wherein said expanded CD3-depleted HLA-haploidentical or mismatched NK cell fraction is prepared by:

(a) *ex vivo* culturing a CD3-depleted NK cell fraction HLA-haploidentical or mismatched for said subject under conditions allowing for cell proliferation, wherein said conditions comprise providing nutrients, serum, IL-15 and nicotinamide in an amount between 1.0 mM to 10 mM;

(b) supplementing said CD3- depleted NK cell fraction with fresh nutrients, human serum, IL-15 and nicotinamide 8-10 days following step (a) to produce an expanded CD3- depleted NK cell fraction;

(c) harvesting said expanded CD3-depleted NK cell fraction in a first portion on day 14 and a second portion on day 16 following step (a), wherein said first portion comprises about 50% of the expanded CD3-depleted NK cell fraction and the second portion comprises the remainder of the expanded CD3-depleted NK cell fraction; and

(d) washing and concentrating said expanded CD3-depleted NK cell fraction of step (c).

13. The use of claim 12, wherein said HLA-haploidentical or mismatched CD3-depleted NK cell fraction is from apheresis.

14. The use of any one of claims 1-13, wherein said serum is 10% human serum.

15. The use of any one of claims 1-14, wherein said IL-15 comprises 20 ng/ml IL-15.

16. The use of any one of claims 1-15, wherein said nicotinamide comprises 5.0 mM nicotinamide.

17. The use of any one of claims 12-16, wherein said CD3-depleted HLA-haploidentical or mismatched NK cell fraction comprises at least 40-90% CD56+/CD3- cells prior to expansion or culturing.

18. The use of any one of claims 1-17, wherein said expanded CD3-depleted HLA-haploidentical or mismatched NK cell fraction is selected according to all of the following parameters:

(a) at least 70% CD56+/CD3- cells;

(b) at least 70% viability;

(c) fewer than $5.0X10^5$ CD3+ cells/Kg mass of patient;

(d) no more than 5 EU endotoxin/Kg mass of patient; and

(e) no Gram-positive micro-organisms.

19. The use of any one of claims 1-18, wherein said first portion and said second portion of said expanded CD3-depleted HLA-haploidentical or mismatched NK cell fraction are provided in fluorinated ethylene propylene (FEP) culture bags.