WHAT IS CLAIMED IS:

1. An expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use in treating a hematological disease in a subject in need thereof, wherein said expanded CD3-depleted HLA-haploidentical or HLA-mismatched NK cell fraction has been expanded by *ex-vivo* culturing with nutrients, serum, IL-15 and nicotinamide in an amount between 1.0 mM to 10 mM, and wherein said subject is being treated with at least one immunosuppressive agent and IL-2.

2. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of claim 1, wherein said subject and said NK cell fraction are a human subject and a human NK cell fraction.

3. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1 or 2, wherein said immunosuppressive agent is a chemotherapeutic immunosuppressive agent and/or irradiation.

4. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-3, wherein said hematological disease is a hematological malignancy, optionally a CD20-positive lymphoid malignancy.

5. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-3, wherein said hematological disease is a multiple myeloma.

6. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-3, wherein said hematological disease is non-Hodgkins lymphoma (NHL), and optionally a CD20-positive B cell NHL.

7. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use method of any one of claims 1-6, wherein said expanded CD3-depleted haploidentical or mismatched NK cell fraction is provided in a first and a second dose.

8. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-6, wherein said NK cell fraction comprises between $1X10^7$/kg and $5X10^8$/kg expanded CD3-depleted HLA-haploidentical or HLA-mismatched NK cells.

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

10. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of claim 7, wherein:

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

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

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

11. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-10, wherein said at least one immunosuppressive agent comprises cyclophosphamide and/or fludarabine, and optionally wherein::

said at least one immunosuppressive agent comprises both cyclophosphamide (40 mg/kg) and fludarabine (25 mg/m^2).

12. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claim 1-11, wherein said IL-2 is provided on each one of days 5, 4 and 3 following treatment with said expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab.

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

(a) obtaining a CD3-depleted NK cell fraction HLA-haploidentical or HLA-mismatched for said subject;

(b) *ex vivo* culturing said CD3-depleted NK cell fraction 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;

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

(d) harvesting said expanded CD3-depleted NK cell fraction 14-16 days following step (b); and

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

14. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of claim 13, wherein said CD3-depleted NK cell fraction is from apheresis.

15. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of claim 13 or 14, wherein said serum is 10% human serum.

16. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 13-15, wherein said IL-15 comprises 20 ng/ml IL-15.

17. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 13-16, wherein said nicotinamide comprises 5.0 mM nicotinamide.

18. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 13-17, wherein said NK cells of step (a) comprise at least 40-90% CD56+/CD3- cells.

19. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-18, characterized by 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.

20. The expanded CD3-depleted haploidentical or mismatched NK cell fraction and obinutuzumab for use of any one of claims 1-19, wherein said expanded CD3-depleted HLA-haploidentical or HLA-mismatched NK cell fraction is provided in a fluorinated ethylene propylene (FEP) culture bag.