In yet another aspect, the present disclosure refers to use of NK cells with plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject wherein said use comprises contacting NK cells *in vitro or ex vivo* with the PM21 particles for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, and wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, wherein the PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

In yet another aspect, the present disclosure refers to use of NK cells with feeder cells expressing membrane bound IL-21 (FC21 feeder cells) in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject, wherein said use comprises contacting NK cells *in vitro or ex vivo* with FC21 feeder cells for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the FC21 feeder cells comprise membrane-bound IL-21 and membrane-bound 41BBL.

In yet another aspect, the present disclosure refers to use of NK cells with plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject wherein said use comprises contacting NK cells *in vitro or ex vivo* with PM21 particles for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

In yet another aspect, the present disclosure refers to use of NK cells with feeder cells expressing membrane bound IL-21 (FC21 feeder cells) in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject, wherein said use comprises contacting NK cells *in vitro or ex vivo* with FC21 feeder cells for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the FC21 feeder cells comprise membrane-bound IL-21 and membrane-bound 41BBL.

In one aspect, the present disclosure refers to use of a pharmaceutical composition comprising natural killer (NK) cells in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject comprising NK cells that have been contacted in vitro or ex vivo with feeder cells comprising IL-21 (FC21 feeder cells) or plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) for 6 to 40 days to induce fucosylation of PSGL-1 on the surface of the NK cells and then the NK cells are

rested for three days prior to the medicament comprising the NK cells to be administered to the subject, wherein the FC21 feeder cells or PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

In another aspect, the present disclosure refers to use of a pharmaceutical composition comprising natural killer (NK) cells in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject comprising NK cells that have been contacted in vitro or ex vivo with feeder cells comprising IL-21 (FC21 feeder cells) or plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) for 6 to 40 days to induce fucosylation of PSGL-1 on the surface of the NK cells and then the NK cells are rested for three days prior to the medicament comprising the NK cells to be administered to the subject, wherein the FC21 feeder cells or PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

III. BRIEF DESCRIPTION OF THE DRAWINGS

3. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate several embodiments and together with the description illustrate the disclosed compositions and methods.

4. Figure 1 shows that PM-21 particles expand cytotoxic NK cells efficiently and selectively. Peripheral blood mononuclear cells (PBMCs) were isolated from leukocyte source and seeded at 0.1 x 10^6 NK cells/mL in SCGM supplemented with 10% FBS, 2 mM Glutamax and 50 U/mL IL-2. PBMCs were stimulated with PM15 (□, black) or PM21 (○, blue) particles at 200 μg/mL for 27 days, the cell content was tested every 2-3 days and shown are relative fold of NK cell expansion (A) and the percentage of suspension cells (B). PM21-particles (825 ± 188 fold, N=13, 4 donors) (blue) are more efficient for NK cell expansion compared to PM15-particles (425 ± 71, N=35, 9 donors) (black) based on cumulative analysis of day 14 data for NK cell expansion (C). PBMCs isolated from three AML patients in remission were cultured for 14

V. CLAIMS

What is claimed is:

1. Use of a pharmaceutical composition comprising natural killer (NK) cells in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject comprising NK cells that have been contacted *in vitro or ex vivo* with feeder cells comprising IL-21 (FC21 feeder cells) or plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) for 6 to 40 days to induce fucosylation of PSGL-1 on the surface of the NK cells and then the NK cells are rested for three days prior to the medicament comprising the NK cells to be administered to the subject, wherein the FC21 feeder cells or PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

2. Use of a pharmaceutical composition comprising natural killer (NK) cells in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject comprising NK cells that have been contacted *in vitro or ex vivo* with feeder cells comprising IL-21 (FC21 feeder cells) or plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) for 6 to 40 days to induce fucosylation of PSGL-1 on the surface of the NK cells and then the NK cells are rested for three days prior to the medicament comprising the NK cells to be administered to the subject, wherein the FC21 feeder cells or PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

3. The use of claim 1 or claim 2, wherein said contact further comprises stimulating the NK cells with IL-2, IL-12, and/or IL-18.

4. The use of claim 1 or claim 2, wherein the contact induces expression of FUT7 within NK cells correlating to the fucosylation of PSGL-1 on the surface of the NK cells.

5. Use of NK cells with plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject wherein said use comprises contacting NK cells *in vitro or ex vivo* with the PM21 particles for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, and wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, wherein the PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL .

6. Use of NK cells with feeder cells expressing membrane bound IL-21 (FC21 feeder cells) in the manufacture of a medicament for treating a bone marrow malignancy or bone marrow born malignancy in a subject, wherein said use comprises contacting NK cells *in vitro or ex vivo* with FC21 feeder cells for 6 to 40 days, whereafter the NK cells are to be adoptively

transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the FC21 feeder cells comprise membrane-bound IL-21 and membrane-bound 41BBL.

7. Use of NK cells with plasma membrane (PM) particles prepared from FC21 feeder cells (PM21 particles) in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject wherein said use comprises contacting NK cells *in vitro or ex vivo* with PM21 particles for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the PM21 particles comprise membrane-bound IL-21 and membrane-bound 41BBL.

8. Use of NK cells with feeder cells expressing membrane bound IL-21 (FC21 feeder cells) in the manufacture of a medicament for treating a viral infection associated with the bone marrow in a subject, wherein said use comprises contacting NK cells *in vitro or ex vivo* with FC21 feeder cells for 6 to 40 days, whereafter the NK cells are to be adoptively transferred to the subject, wherein the contacting induces fucosylation of PSGL-1 on the surface of the NK cells, and wherein the FC21 feeder cells comprise membrane-bound IL-21 and membrane-bound 41BBL.

9. The use of any one of claims 1-4, wherein the NK cells are contacted with PM21 particles for at least 10 days.

10. The use of any one of claims 5-8, wherein the NK cells are contacted with PM21 particles or FC21 feeder cells for at least 10 days.

11. The use of any one of claims 5-8, wherein after contact with the PM21 particles or FC21 feeder cells, the NK cells are rested for three days, whereafter the NK cells are to be adoptively transferred to the subject.