CLAIMS

1. Use of a population of hematopoietic stem cells treated with a TAT-MYC fusion protein, a TAT-Bcl-2 fusion protein, or both, for 10 minutes to 24 hours, in the manufacture of a composition for treating a subject in need of a hematopoietic stem cell transplantation.

2. The use of claim 1, wherein the population of hematopoietic stem cells is treated with the TAT-MYC fusion protein, the TAT-Bcl-2 fusion protein, or both, for about 1 hour.

3. The use of either one of claims 1 or 2, wherein the population of hematopoietic stem cells is treated with the TAT-MYC fusion protein.

4. The use of any one of claims 1 to 3, wherein the population of hematopoietic stem cells is treated with the TAT-MYC fusion protein and the TAT-Bcl-2 fusion protein.

5. The use of any one of claims 1 to 4, wherein the subject suffers from one or more of a hematological malignancy, bone marrow failure syndrome, an autoimmune disease, hematopoietic stem cell engraftment failure, a decrease in hematopoietic compartment cells due to chemotherapy, or a decrease in hematopoietic compartment cells due to radiation therapy.

6. The use of any one of claims 1 to 4, wherein the subject has received an organ transplant.

7. The use of any one of claims 1 to 4, wherein the subject has received a hematopoietic stem cell transplant or a bone marrow transplant.

8. The use of any one of claims 1 to 7, wherein the hematopoietic stem cells obtained prior to treatment are from bone marrow, peripheral blood cells, peripheral blood cells that have undergone apheresis, peripheral blood cells that have undergone leukapheresis, umbilical cord blood, or amniotic fluid.