Claims

1. Use of an *in vitro* produced peripheral blood mononuclear cell (PBMC) monolayer or bone-marrow cell monolayer, wherein natural-occurring cell-cell interactions and membrane integrity are maintained during formation of the monolayer, for determining whether the PBMC donor/bone-marrow cell donor suffers from a disease or is predisposed to suffer from a disease or in a diagnostic method for determining whether a subject suffering from or predisposed to a disease will respond or is responsive to treatment with a therapeutic agent, wherein the disease is a hematologic malignancy, a malignancy of myeloid and/or lymphoid tissue, a myeloproliferative disorder, an inflammatory disorder, a latent virus infection, a cellular growth disorder, a cellular chemotaxis disorder, a metabolic disorder, or an autoimmune disorder.

2. The use of claim 1, wherein the PBMC monolayer or bone-marrow cell monolayer is produced by a method for culturing PBMCs or bone-marrow cells comprising

    (a) isolating PBMCs from a blood sample or bone-marrow cells from bone-marrow; and
    (b) incubating PBMCs or bone-marrow cells at a density of 100 cells per mm^2 to 30000 cells per mm^2.

3. The use of claim 2, wherein the PBMCs or bone-marrow cells are incubated at a density of about 2000 cells per mm^2.

4. The use of claims 2 or 3, wherein PBMCs or bone-marrow cells are isolated from non-nucleated cells, wherein the PBMC sample or bone-marrow cell sample to be incubated contains less than about 100 non-nucleated cells per PBMC/bone-marrow cell.

5. The use of any one of claims 2 to 4, wherein the method further comprises a step (c), fixing said PBMCs or bone-marrow cells and/or fixing the formed PBMC monolayer or bone-marrow cell monolayer.

6. The use of claim 5, wherein the method further comprises, subsequent to step (c), a step (d) comprising adding a detectable label to the fixed PBMCs/bone-marrow cells.

7. The use of claim 6, wherein the detectable label is an antibody.

8. The use of any one of claims 2 to 7, wherein the method further comprises a step of adding a viability dye.

9. The use of claim 8, wherein the addition of a viability dye occurs prior to fixation of the formed PBMC monolayer or bone-marrow cell monolayer.

10. The use of any one of claims 2 to 9, wherein subsequent to isolation the PBMCs or bone-marrow cells are maintained/processed/analyzed at about 1g, i.e. 9.81 m/s^2.

11. The use of any one of claims 2 to 10, wherein subsequent to isolation the PBMCs or bone-marrow cells are not subjected to centrifugation or spinning.

12. A method for diagnosing a disease or predisposition to a disease in a PBMC donor/bone-marrow cell donor, comprising contacting the monolayer as defined in any one of claims 1 to 11 with a diagnostic agent, wherein the disease is a hematologic malignancy, a malignancy of myeloid and/or lymphoid tissue, a myeloproliferative disorder, an inflammatory disorder, a latent virus infection, a cellular growth disorder, a cellular chemotaxis disorder, a metabolic disorder, or an autoimmune disorder.

13. The use or method of any one of claims 1 to 12, wherein the disease is leukemia or lymphoma.

14. A method for determining whether a subject suffering from or predisposed to a disease will respond or is responsive to treatment with a therapeutic agent comprising:

(a) isolating PBMCs/bone-marrow cells from a blood sample obtained from said subject;
(b) incubating said PBMCs/bone-marrow cells at a density of 100 cells per mm^2 to 30000 cells per mm^2;
(c) contacting said PBMCs/bone-marrow cells with said therapeutic agent; and
(d) assessing the response of the PBMCs/bone-marrow cells to the therapeutic agent,

wherein a PBMC monolayer or bone-marrow cell monolayer is formed during step (b), wherein natural-occurring cell-cell interactions and membrane integrity are maintained during formation of the monolayer and wherein the disease is a hematologic malignancy or a malignancy of myeloid and/or lymphoid tissue.

15. The method of claim 14, wherein the PBMCs/bone-marrow cells are incubated at a density of about 2000 cells per mm^2.