Claims

1. An antibody or an antigen binding portion thereof that binds specifically to a human corneal endothelial cell (hCENC), wherein the target of the ~~monoclonal~~ antibody, or antigen binding portion thereof, is cell surface-expressed Peroxiredoxin-6 (Prdx6).

2. The antibody of claim 1 or an antigen binding portion thereof, wherein the origin of the antibody, or an antigen binding portion thereof, is monoclonal or polyclonal.

3. The antibody of claim 1 or an antigen binding portion thereof, wherein the antibody or an antigen binding portion thereof is selected from a group consisting of Fab, Fab', F(ab')2, Fv, diabodies, Fd, dAb, maxibodies, single chain antibody molecules, complementarity determing region (CDR) fragments, scFv, diabodies, triabodies, tetrabodies and polypeptides that contain at least a portion of an immunoglobulin, wherein the portion of an immunoglobulin is sufficient to confer specific antigen binding to a target polypeptide.

4. The antibody of claim 1 or an antigen binding portion thereof, wherein the complementarity determining regions are selected from a group consisting of heavy chain CDR 1 (SEQ ID No. 1), heavy chain CDR 2 (SEQ ID No. 2), heavy chain CDR 3 (SEQ ID No. 3), light chain CDR 1 (SEQ ID No. 4), light chain CDR 2 (SEQ ID No. 5) and light chain CDR 3 (SEQ ID No. 6).

5. The antibody of claim 1, or an antigen binding portion thereof, wherein the antibody or antigen binding portion thereof does not bind significantly to cells selected from the group consisting of epithelial cells, stromal fibroblast cells, human lung fibroblasts, hESC-derived neural crest cells and human embryonic stem cells.

6. The ~~monoclonal~~ antibody according to any one of the preceding claims, or antigen binding portion thereof, wherein the antibody binds to human corneal endothelial cells in a manner in which the strength of a signal derived from the binding of the antibody to the antigen is proportional to the amount of cells exhibiting a "cobblestone-like" morphology, thus enabling a grading of the human corneal endothelial cell quality.

7. The ~~monoclonal~~ antibody according to any one of the preceding claims, or antigen binding portion thereof, wherein the antibody does not bind to immortalized human corneal endothelial cells.

8. A method for determining suitability of a cell sample for corneal transplantation, wherein the method comprises:
   a. contacting a sample of donor cells obtained from a patient with an antibody according to any one of claims 1 to 7;
   b. measuring an antibody binding signal;
   c. wherein an increased antibody binding signal compared to a control signal indicates a cobblestone-like cell morphology and thus suitability of the cell sample for corneal transplantation; wherein the control signal is obtained empirically from measuring multiple cell samples with known morphologies.

9. A method for quantitative enrichment of human corneal endothelial cells from a mixture of cells, wherein the method comprises the use of an antibody, or an antigen binding portion thereof, according to any one of claims 1 to 7.

10. A method of isolating human corneal endothelial cells from a mixture of cell, wherein the method comprises the use of an antibody, or an antigen binding portion thereof, according to any one of claims 1 to 7.

11. The methods according to claims 9 and 10 comprising the steps of:
   a. exposing a mixture of cells to an ~~monoclonal~~ antibody according to any one of claims 1 to 7;
   b. separating cells that bind to said ~~monoclonal~~ antibody from cells that do not bind to said antibody or antigen binding fragment thereof.

12. The ~~mixture of cell~~method according to claims 9 to 11, wherein the cell types found in the mixture are cell types associated cell samples in a clinical setting.

13. The ~~human corneal endothelial cells (hCENCs)~~method according to any one of ~~the preceding~~ claims 9 to 12, wherein the isolated human corneal endothelial cells~~hCENCs~~ are viable cells.

14. The ~~human corneal endothelial cells (hCENCs)~~method according to any one of ~~the preceding~~ claims 9 to 13, wherein the isolated human corneal endothelial cells~~hCENCs~~ are suitable for medical transplant and grafting purposes.

15. The method according to claim ~~10~~11, wherein the separating is a method selected from the group consisting of column chromatography, magnetic affinity cell separation and fluorescence-activated cell sorting.

16. A hybridoma cell line with the deposition number of PTA-121135.

17. A method of generating ~~monoclonal~~ antibodies according to claim 1 by culturing hybridoma cells with the deposition number PTA-121135.