~~CLAIMS~~ Claims

~~1. A method of enhancing or initiating regeneration of an organ in a subject in need thereof comprising the administration of endothelial cells specific to said organ, or inductive endothelial cells specific to said organ, into the area of the body in which organ regeneration is desired in said subject.~~

~~The method of claim~~

~~2.~~ 1~~, wherein said organ is the liver and said method comprises the intrahepatic transplantation~~. Use of liver sinusoidal endothelial cells (LSECs~~), or inductive LSECs.~~

~~3. The method of claim 2, further comprising administration of VEGF-A.~~

~~4. The method of claim 2, wherein the LSECs or inductive LSECs are VEGFR2$^+$VE-cadherin$^+$VEGFR3$^+$CD34$^-$ factor VIII$^+$LSECs.~~

~~5. The method of claim 2, further comprising administration of hepatocytes.~~

~~6. The method of claim 1, wherein said organ is the lung and said method comprises intravenous or intratracheal transplantation of pulmonary capillary endothelial cells (PCECs), or inductive PCECs.~~

~~7. The method of claim 6, further comprising administration of one or more of MMP14, VEGF-A, or FGF.~~

~~8. The method of claim 6, wherein said PCECs or inductive PCECs express MMP14.~~

9. The method of claim 6, further comprising administration of epithelial progenitor cells.

A method of expanding hepatocytes in culture by co-culturing said hepatocytes with liver sinusoidal endothelial cells.

A method of expanding lung epithelial progenitor cells in culture by co-culturing said lung epithelial progenitor cells with pulmonary capillary endothelial cells.

12. A method to enhance or induce organ regeneration in a subject in need thereof comprising administering one or more of VEGF-A, VEGF-E, FGF-2, MMP14, EGF, or other EGF-receptor ligands to said subject in an amount sufficient to enhance or induce organ regeneration in said subject.

13. The method of claim 12, wherein the organ is the liver.

14. The method of claim 12, wherein the organ is the lung.

15. A pharmaceutical composition for administration to a subject in need of organ regeneration, comprising isolated endothelial cells specific to said organ, or isolated inductive endothelial cells specific to said organ, in combination with a pharmaceutically-acceptable carrier.

16. The pharmaceutical composition of claim 15, wherein said endothelial cells or inductive endothelial cells are autologous cells.

17. The pharmaceutical composition of claim 15, wherein the organ is the liver and the cells are VEGFR2^{+}VE-cadherin^{+}VEGFR3^{+}CD34^{-} factor VIII^{+} LSECs.

~~18. The pharmaceutical composition of claim 15, further comprising one or more of VEGF-A, VEGF-E, FGF-2, EGF, or MMP14.~~

~~19. The pharmaceutical composition of claim 15, wherein the organ is the lung and the cells are VEGFR2$^+$VE-cadherin$^+$CD34$^+$CD31$^+$FGFR1$^+$ PCECs.~~

~~20. A method of isolating liver-specific endothelial cells comprising isolating cells that are VEGFR2$^+$VE-cadherin$^+$VEGFR3$^+$CD34$^-$ factor VIII$^+$ cells.~~

~~A method of isolating lung-specific endothelial cells comprising isolating cells that are VEGFR2$^+$VE-cadherin$^+$CD34$^+$CD31$^+$FGFR1$^+$ cells.~~

~~22. Liver sinusoidal endothelial cells (LSECs~~) or activated LSECs in the manufacture of a medicament for the treatment of liver disease, wherein the medicament is for ~~use in a method of~~ enhancing liver regeneration in a mammal in need thereof, said liver regeneration comprising proliferation of hepatocytes and regeneration of liver mass, ~~and said method comprising intrahepatic transplantation of~~ said LSECs are to be intrahepatically transplanted to said mammal, and wherein said mammal is in need of proliferation of hepatocytes and regeneration of liver mass.

~~23.~~ 2. The ~~LSECs or activated LSECs for~~ use according to claims ~~22~~1, wherein the LSECs or activated LSECs are VEGFR2$^+$VE-cadherin$^+$VEGFR3$^+$CD34$^-$ factor VIII$^+$Prox1$^-$CD45$^-$ LSECs.

~~24.~~ 3. The ~~LSECs or activated LSECs for~~ use according to claim ~~22~~1, wherein the LSECs or activated LSECs are VEGFR2$^+$VEGFR3$^+$CD34$^-$Id1$^+$ LSECs which induce hepatic proliferation.

~~25.~~ 4. The ~~LSECs or activated LSECs for~~ use according to claim ~~22~~1, wherein the ~~method~~use further comprises ~~administration of~~ hepatocytes to be administered.

~~26. A~~5. Use of a pharmaceutical composition ~~for use~~ in ~~a method~~the manufacture of a medicament for the treatment of liver disease, wherein the medicament is for enhancing liver regeneration in a mammal in need thereof, said liver regeneration comprising proliferation of hepatocytes and regeneration of liver mass, and said pharmaceutical composition comprising LSECs or activated LSECs as recited in ~~anyone~~any one of claims ~~22~~1 to ~~24~~3 and a pharmaceutically acceptable carrier; wherein said mammal is in need of proliferation of hepatocytes and regeneration of liver mass.

6. Pulmonary capillary endothelial cells (PCECs), or inductive PCECs for use in enhancing or initiating regeneration of lung in a subject in need thereof.

7. Use of PCECs, or inductive PCECs in the manufacture of a medicament for the treatment of lung diseases and injuries, wherein the medicament is for enhancing or initiating regeneration of an organ in a subject in need thereof, wherein the PCECs or inductive PCECs are to be administered into an area of the body in which lungregeneration is desired in said subject.

8. The use of claim 7, wherein said PCECs or inductive PCECs are to be transplanted intravenously or intratracheally.

9. The use of claim 8, further comprising one or more of MMP14, VEGF-A, or FGF to be administered.

10. The use of claim 8, wherein said PCECs or inductive PCECs express MMP14.

11. The use of claim 8, further comprising epithelial progenitor cells to be administered.

12. A method of expanding hepatocytes in culture by co-culturing said hepatocytes with liver sinusoidal endothelial cells.

13. A method of expanding lung epithelial progenitor cells in culture by co-culturing said lung epithelial progenitor cells with pulmonary capillary endothelial cells.

14. One or more of VEGF-A, VEGF-E, FGF-2, MMP14, EGF, or other EGF-receptor ligands for use in enhancing or initiating lung regeneration in a subject in need thereof.

15. Use of one or more of VEGF-A, VEGF-E, FGF-2, MMP14, EGF, or other EGF-receptor ligands in the manufacture of a medicament for the treatment of lung diseases and injuries in a subject in need thereof, wherein the medicament is to be administered to said subject in an amount sufficient to enhance or induce lung regeneration in said subject.

16. A pharmaceutical composition for use in lung regeneration, wherein the pharmaceutical composition comprises PCECs, or inductive PCECs to be administered in combination with a pharmaceutically-acceptable carrier to a subject in need of lung regeneration.

17. Use of a pharmaceutical composition in the manufacture of a medicament for the treatment of lung diseases and injuries, wherein the use comprises PCECs, or inductive PCECs to be administered in combination with a pharmaceutically-acceptable carrier to a subject in need of lung regeneration.

18. The use of claim 17, wherein said PCECs or inductive PCECs are autologous cells.

19. The use of claim 17, further comprising one or more of VEGF-A, VEGF-E, FGF-2, EGF, or MMP14 to be administered.

20. The use of claim 17, wherein the PCECs or inductive PCECs are $VEGFR2^{+}$VE-$cadherin^{+}CD34^{+}CD31^{+}FGFR1^{+}$ PCECs.

21. A method of isolating liver-specific endothelial cells comprising isolating cells that are $VEGFR2^{+}$VE-$cadherin^{+}VEGFR3^{+}CD34^{-}$ factor $VIII^{+}$ cells.

22. A method of isolating lung-specific endothelial cells comprising isolating cells that are $VEGFR2^{+}VE\text{-}cadherin^{+}CD34^{+}CD31^{+}FGFR1^{+}$ cells.