CLAIMS

1. A transgenic swine, comprising one or more nucleotide sequences encoding one or more HLA I polypeptides and/or one or more HLA II polypeptides inserted into one or more native SLA loci of the pig genome,

wherein the one or more nucleotide sequences are inserted downstream a native SLA I promoter.

2. The transgenic swine of claim 1, wherein the one or more nucleotide sequences encode HLA I polypeptides inserted into a native SLA I locus.

3. The transgenic swine of claim 2, wherein the SLA I locus is selected from the group consisting of SLA-1 and SLA-2.

4. The transgenic swine of claim 2, wherein the HLA I polypeptides comprise HLA-A2 fused to human beta-2 microglobulin (B2M).

5. The transgenic swine of claim 2-4, wherein the one or more nucleotide sequences are inserted at the intron 1/exon 2 junction of the SLA I locus.

6. The transgenic swine of claims 2-5, wherein the one or more nucleotide sequences further encode HLA II polypeptides inserted into the native SLA-DQα locus.

7. The transgenic swine of claim 1, wherein the one or more nucleotide sequences encode HLA II polypeptides inserted into the native SLA-DQα locus.

8. The transgenic swine of claims 6-7, wherein the HLA II polypeptides comprise HLA-DQ8 polypeptides.

9. The transgenic pig of claim 8, wherein the HLA-DQ8 polypeptides are targeted to the native SLA-DQα locus through a bicistronic vector encoding HLA-DQ8 (HLA-DQA1:03:01:01 and HLA-DQB1:03:02:01).

10. The transgenic swine of claim 9, wherein the bicistronic vector further comprises a high-efficiency IRES element.

11. The transgenic swine of claims 7-10, wherein the one or more nucleotide sequences encoding the HLA II polypeptides are inserted downstream the native SLA DQα promoter.

12. The transgenic swine of claims 7-10, wherein the one or more nucleotide sequences encoding the HLA II polypeptides are inserted at the intron 1/exon 2 junction of the SLA DQα locus.

13. The transgenic swine of claim 1, wherein the HLA I polypeptides are selected from the group consisting of HLA-A, HLA-A2, HLA-B, HLA-C, HLA-E, HLA-F and HLA-G, and wherein the HLA II polypeptides are selected from the group consisting of HLA-DP, HLA-DM, HLA-DO, HLA-DQ, and HLA-DR.

14. Use of thymic tissue from the transgenic swine according to any of claims 1-13 in the manufacture of a medicament for xenotransplantation of thymic tissue into a subject in need thereof.

15. Use of thymic tissue from the transgenic swine according to any of claims 1-13 in the manufacture of a medicament to recover or restore impairment of the function of the thymus in a subject in need thereof.

16. Use of thymic tissue from the transgenic swine according to any of claims 1-13 in the manufacture of a medicament to reconstitute T cells in a subject in need thereof.

17. The use of claims 14-16, wherein the subject is a human.

18. The use of claims 14-17, wherein the transgenic swine comprises HLA polypeptides derived from the subject.

19. A method of producing a transgenic swine of any of claims 1-13, comprising administering at least one targeting vector and at least one CRISPR-Cas9 plasmid into a swine cell, wherein the targeting vector comprises one or more nucleotide sequences encoding one or more HLA I polypeptides and/or one or more HLA II polypeptides.

20. The method of claim 19, wherein the one or more nucleotide sequences encoding one or more HLA I polypeptides and/or one or more HLA II polypeptides derive from a specific individual subject.

21. A method of generating a human immune system (HIS) mouse, comprising thymectomizing the mouse and introducing swine fetal thymic tissue and human CD34+ cells into the mouse.

22. The method of claim 21, wherein the human CD34+ cells are fetal or adult.

23. The method of claim 21, wherein the human CD34+ cells are derived from cord blood.

24. A method of generating a human immune system (HIS) mouse, comprising thymectomizing the mouse and introducing swine fetal thymic tissue, wherein the fetal thymic tissue is derived from the transgenic swine of claims 1-13.