METHODS OF TREATMENT USING ILT7 BINDING PROTEINS

Background

Field

[0001] The present disclosure is related to methods of treating autoimmune disorders in a subject comprising administering immunoglobulin-like transcript 7 (ILT7) binding proteins to a subject having elevated type I interferon gene signature (IFNGS). The present disclosure is also relates to methods of reducing pDCs in tissues comprising administering an ILT7-binding protein to a subject in need thereof.

Background

[0002] The type I interferon (IFN) axis is one of the most significant pathways in human disease, and its dysregulation is central to the pathogenesis of many chronic autoimmune diseases, such as systemic lupus erythematosus (SLE). Although the precise etiology of SLE and other autoimmune diseases is not fully resolved, it is believed that a combination of environmental and genetic factors, together with an accumulation of cellular debris, leads to a breakdown in peripheral immune tolerance, characterized by high levels of circulating autoreactive antibodies. Currently available methods are directed towards treating autoimmune diseases and not towards preventing such diseases. Further, conventional treatment options for autoimmune diseases include immunosuppressant drugs that are associated with a wide range of side effects. Thus, there is a need for prophylactic and better therapeutic alternatives for treating and preventing autoimmune diseases. The present disclosure addresses these needs.

Summary

[0003] In certain examples, the methods of the present disclosure can be used for reducing a type I interferon gene signature (IFNGS) in a subject in need thereof. The methods comprise administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein. The ILT7 binding protein is administered to the subject when the type I IFNGS is elevated in the subject relative to the type I IFNGS in a normal subject. In a specific example, the ILT7 binding protein may be administered to subjects with elevated baseline type I IFNGS relative to the type I IFNGS in a

normal subject, these subjects are monitored for reduction of the type I IFNGS after treatment. The ILT7-binding protein binds to the same ILT7 epitope as an antibody comprising a heavy chain variable region (VH) of SEQ ID NO:1 and a light chain variable region (VL) of SEQ ID NO:2. In certain examples, the subject is monitored for reduction of the type I IFNGS after treatment.

[003a] In one aspect, the present disclosure refers to use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for reducing a type I interferon gene signature (IFNGS) in a subject with an autoimmune disorder in need thereof, wherein a pharmaceutically effective amount of the ILT7 binding protein is to be administered to the subject when the type I IFNGS is elevated in the subject relative to the type I IFNGS in a normal subject, wherein the type I IFNGS is determined by mRNA levels of at least two genes selected from the group consisting of SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18, wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

[003b] In another aspect, the present disclosure refers to use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for treating an autoimmune disorder in a subject in need thereof, wherein a pharmaceutically effective amount of the ILT7-binding protein is to be administered to the subject, wherein the pharmaceutically effective amount of the ILT7-binding protein is about 1 mg, about 5 mg, about 15 mg, about 50 mg, about 100 mg, or about 150 mg, wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

[003c] In another aspect, the present disclosure refers to use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for treating an autoimmune disorder, wherein an effective amount of an ILT7 binding protein is to be administered to a subject in need thereof, wherein the medicament is effective in treating the

autoimmune disorder as determined by detecting in a sample of the subject: i. fewer plasmacytoid dendritic cells (pDCs) compared to a sample of the subject before the ILT7 binding protein is to be administered; or ii. reduced mRNA expression from two or more genes selected from the group consisting of: SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18, compared to the mRNA expression level of the gene in a sample of the subject before the ILT7 binding protein is to be administered, wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

[0004] In certain examples, the type I IFNGS is measured in a test biological sample taken from the subject. The test sample includes, but is not limited to, blood, sputum, saliva, skin cells, skin biopsy samples, kidney cells, lung cells, liver cells, heart cells, brain cells, nervous tissue, thyroid cells, eye cells, skeletal muscle cells, cartilage, bone tissue, and cultured cells.

[0005] In some examples, the type I IFNGS is elevated by at least about 4-fold in the test biological sample relative to the normal biological sample. In certain examples, the type I IFNGS comprises the collective expression levels of two or more type I interferon (IFN)-inducible genes. In some examples, the two or more type I interferon (IFN)-inducible genes are selected from the group consisting of SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18. In certain examples, the type I IFNGS comprises the collective expression levels of all of SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18.

[0006] In some examples, the type I IFNGS is determined by assaying the mRNA levels of the two or more type I interferon (IFN)-inducible genes in the test biological sample. In particular examples, the type I IFNGS is determined by assaying the mRNA levels of the 21 type I interferon (IFN)-inducible genes in the test biological sample.

[0007] In some examples, administering the ILT7-binding protein causes a reduction in plasmacytoid dendritic cells (pDCs) in the subject. In certain examples, the pDCs are circulating pDCs. In particular examples, the reduction in the pDCs is reversible.

[0008] In some examples, reducing the type I IFNGS treats an autoimmune disease in the subject. In certain examples, the autoimmune disease is selected from the group consisting of systemic lupus erythematosus (SLE), lupus nephritis, cutaneous lupus erythematosus (CLE), Sjögren's syndrome, inflammatory myositis, such as dermatomyositis, inclusion body myositis, juvenile myositis and polymyositis, systemic sclerosis, diabetes, Hashimoto's disease,

autoimmune adrenal insufficiency, pure red cell anemia, multiple sclerosis, rheumatic carditis, psoriasis, psoriatic arthritis, rheumatoid arthritis, chronic inflammation, chronic rheumatism, vitiligo, alopecia areata, hidradenitis suppurativa, celiac disease, acute and chronic graft versus host disease (GVHD), vascular inflammation, myocardial infarction, and Type-1 interferonopathies. In some examples, the autoimmune disease is SLE or CLE. In other examples, the autoimmune disease is Sjögren's syndrome. In yet other examples, the autoimmune disease is dermatomyositis. In other examples, the autoimmune disease is polymyositis. In yet other examples, the autoimmune disease is systemic sclerosis. In still other examples, the autoimmune disease is hidradenitis suppurativa. In other examples, the autoimmune disease is vitiligo.

[0009] In some examples, the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively. In particular examples, the ILT7 binding protein is an antibody comprising a variable heavy chain (VH) that is at least 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to SEQ ID NO:1 and/or a variable light chain (VL) that is at least 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to SEQ ID NO:2. In certain examples, the ILT7-binding protein is an antibody comprising a heavy chain variable region (VH) of SEQ ID NO:1 and a light chain variable region (VL) of SEQ ID NO:2. In some examples, the antibody is afucosylated.

[0010] In some examples, the pharmaceutically effective amount of the ILT7-binding protein ranges from about 0.1 mg to about 1000 mg. In certain examples, the pharmaceutically effective amount of the ILT7-binding protein is about 1 mg, about 5 mg, about 15 mg, about 50 mg, about 100 mg, or about 150 mg. In some examples, the ILT7-binding protein is administered by subcutaneous injection.

[0011] In some examples, administration of the ILT7-binding protein leads to at least about 50% reduction in the type I IFNGS in the subject, compared to the type I IFNGS prior to administration of the ILT7-binding protein. In certain examples, the ILT7-binding protein induces antibody-dependent cell-mediated cytotoxicity (ADCC) activity against pDCs. In some examples, the ILT7-binding protein suppresses release of type I interferon (IFN) from pDCs. In certain

examples, the type I IFN is IFNα. In some examples, the ILT7-binding protein specifically binds to ILT7. In some examples, the ILT7 is located on pDCs.

[0012] In other examples, the methods of the present disclosure can be used to monitor the effectiveness of treatment of conditions marked by activated pDCs. The methods comprise the steps of: (a) measuring a type I interferon gene signature (IFNGS) in a biological sample taken from the subject to obtain a baseline value of the type I IFNGS; and (b) measuring the type I IFNGS in a biological sample taken from the subject after administering a treatment, wherein the treatment comprises an immunoglobulin-like transcript 7 (ILT7)-binding protein. In some examples a decrease in the type I IFNGS in step (b) compared to the baseline value indicates that the treatment is effective. The ILT7-binding protein binds to the same ILT7 epitope as an antibody comprising a heavy chain variable region (VH) of SEQ ID NO:1 and a light chain variable region (VL) of SEQ ID NO:2.

[0013] In additional examples, the methods of the present disclosure can be used for reducing plasmacytoid dendritic cells (pDCs) in a tissue of a subject in need thereof. The methods comprise administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein. In certain examples, the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

[0014] In some examples, the tissue is selected from the group consisting of skin cells, skin biopsy samples, kidney cells, lung cells, liver cells, heart cells, brain cells, nervous tissue, thyroid cells, eye cells, skeletal muscle cells, cartilage, bone tissue, and cells from airway passages. In certain examples, the tissue is a skin cell. In some examples, the tissue is a skin biopsy sample.

[0015] In some examples, the method results in a decrease in pDCs in the tissue compared to a baseline value. In certain examples, the decrease in pDCs in the tissue compared to the baseline value ranges from about 1% to about 99%. In some examples, the decrease in pDCs in the tissue compared to the baseline value is at least about 50%.

[0016] In some examples, the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

[0017] In further examples, the methods of the present disclosure can be used for treating an autoimmune disorder in a subject in need thereof. The methods comprise administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein. In some examples, the pharmaceutically effective amount of the ILT7-binding protein is about 1 mg, about 5 mg, about 15 mg, about 50 mg, about 100 mg, or about 150 mg. In some examples, the pharmaceutically effective amount of the ILT7-binding protein is about 50 mg. In certain examples, the pharmaceutically effective amount of the ILT7-binding protein is about 150 mg.

[0018] In certain examples, the methods of the present disclosure can be used for treating an autoimmune disorder in a subject in need thereof, the methods comprising administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein, wherein the pharmaceutically effective amount of the ILT7-binding protein is about 50 mg.

[0019] In other examples, the methods of the present disclosure can be used for treating an autoimmune disorder in a subject in need thereof, the methods comprising administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein, wherein the pharmaceutically effective amount of the ILT7-binding protein is about 150 mg.

[0020] In additional examples, the methods of the present disclosure can be used for reducing plasmacytoid dendritic cells (pDCs) in a tissue of a subject in need thereof, the method comprising administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein. The pharmaceutically effective amount of the ILT7-binding protein is about 50 mg.

[0021] In further examples, the methods of the present disclosure can be used for reducing plasmacytoid dendritic cells (pDCs) in a tissue of a subject in need thereof, the method comprising administering to the subject a pharmaceutically effective amount of an

immunoglobulin-like transcript 7 (ILT7)-binding protein. The pharmaceutically effective amount of the ILT7-binding protein is about 150 mg.

[0022] In some examples, the decrease in pDCs in the tissue compared to the baseline value ranges from about 1% to about 99%. In certain examples, the decrease in pDCs in the tissue compared to the baseline value is at least about 50%.

[0023] In some examples, the subject has a high blood type I IFNGS level prior to administration of the ILT7-binding protein. In particular examples, subject has a high pDC level in a tissue biopsy prior to administration of the ILT7-binding protein.

[0024] In some examples, the autoimmune disease is systemic lupus erythematosus (SLE), lupus nephritis, cutaneous lupus erythematosus (CLE), Sjögren's syndrome, inflammatory myositis, such as dermatomyositis, inclusion body myositis, juvenile myositis and polymyositis, systemic sclerosis, diabetes, Hashimoto's disease, autoimmune adrenal insufficiency, pure red cell anemia, multiple sclerosis, rheumatic carditis, psoriasis, psoriatic arthritis, rheumatoid arthritis, chronic inflammation, chronic rheumatism, vitiligo, alopecia areata, hidradenitis suppurativa, celiac disease, acute and chronic graft versus host disease (GVHD), vascular inflammation, myocardial infarction, and Type-1 interferonopathies. In some examples, the autoimmune disease is SLE. In other examples, the autoimmune disease is CLE. In some examples, the autoimmune disease is lupus. In certain examples, the subject does not have discoid lupus erythematosus (DLE).

[0025] In some examples, the methods of the present disclosure can be used for selecting a patient for treatment with an ILT7-binding protein, the method comprising: (i) determining the baseline blood type I IFNGS level of the patient, and (ii) selecting those patients with high baseline blood type I IFNGS levels for treatment with the ILT7-binding protein.

[0026] In certain examples, the methods of the present disclosure are directed to treating an autoimmune disorder in a subject in need thereof, the method comprising administering to the subject a pharmaceutically effective amount of an immunoglobulin-like transcript 7 (ILT7)-binding protein, wherein the subject is determined to have a high blood type I IFNGS level prior to administration of the ILT7-binding protein. In some examples, the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1,

LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively. In some examples, the ILT7 binding protein is an antibody comprising a variable heavy chain (VH) that is at least 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to SEQ ID NO:1 and/or a variable light chain (VL) that is at least 85%, 90%, 95%, 96%, 97%, 98% or 99% identical to SEQ ID NO:2. In certain examples, the ILT7-binding protein is an antibody comprising a heavy chain variable region (VH) of SEQ ID NO:1 and a light chain variable region (VL) of SEQ ID NO:2. In some examples, the antibody is afucosylated.

Brief Description of the Figures

[0027] FIG. 1 shows the overall study design for a Phase Ia, randomized, blinded, placebo-controlled study to evaluate the safety and tolerability of single-ascending subcutaneous doses of the ILT7-binding protein used in the methods described herein in subjects suffering from at least one of the following five autoimmune diseases: systemic lupus erythematosus (SLE), Sjögren's syndrome, dermatomyositis, polymyositis, or systemic sclerosis.

[0028] FIG. 2 shows details of the single ascending dose study design.

[0029] FIG. 3 shows the mean serum concentration profile of the ILT7-binding protein used in the methods described herein following a single subcutaneous dose in a subject suffering from at least one of the following five autoimmune diseases: SLE, Sjögren's syndrome, dermatomyositis, polymyositis, or systemic sclerosis.

[0030] FIG. 4 shows pDC levels (%) over time, as a percent of the baseline level (value using % peripheral blood mononuclear cells) in a subject, suffering from at least one of the following five autoimmune diseases: SLE, Sjögren's syndrome, dermatomyositis, polymyositis, or systemic sclerosis, following a single subcutaneous dose (1 mg, 5 mg, 15 mg, 50 mg, or 150 mg) of an ILT7-binding protein used in the methods described herein (VIB7734).

[0031] FIG. 5 shows pDC levels (%) over time, as a percent of the baseline level (value using absolute concentration) in a subject, suffering from at least one of the following five autoimmune diseases: SLE, Sjögren's syndrome, dermatomyositis, polymyositis, or systemic sclerosis, following a single subcutaneous dose (1 mg, 5 mg, 15 mg, 50 mg, or 150 mg) of an ILT7-binding protein used in the methods described herein (VIB7734).

What is claimed is:

1. Use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for reducing a type I interferon gene signature (IFNGS) in a subject with an autoimmune disorder in need thereof, wherein a pharmaceutically effective amount of the ILT7 binding protein is to be administered to the subject when the type I IFNGS is elevated in the subject relative to the type I IFNGS in a normal subject, wherein the type I IFNGS is determined by mRNA levels of at least two genes selected from the group consisting of SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18,

wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

2. The use of claim 1, wherein the type I IFNGS is measured in a test biological sample taken from the subject, and wherein the test biological sample is selected from the group consisting of blood, sputum, saliva, skin biopsy, kidney cells, lung cells, liver cells, heart cells, brain cells, nervous tissue, thyroid cells, eye cells, skeletal muscle cells, cartilage, bone tissue, and cultured cells.

3. The use of claim 2, wherein the test biological sample is blood or the skin biopsy.

4. The use of claim 2, wherein the type I IFNGS is elevated by at least 4-fold in the test biological sample relative to the type I IFNGS level of the normal subject

5. The use of claim 1, wherein the type I IFNGS is determined by mRNA levels of all of SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3, LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18.

6. The use of any one of claims 1-5, wherein the medicament is effective in reducing a level of:

i. plasmacytoid dendritic cells (pDCs) in the subject

ii. type I IFNGS; and/or

iii. the pDCs and the type I IFNGS.

7. The use of any one of claims 1-6, wherein the subject in need has an autoimmune disease.

8. The use of claim 7, wherein the autoimmune disease is selected from the group consisting of systemic lupus erythematosus (SLE), lupus nephritis, cutaneous lupus erythematosus (CLE), Sjögren's syndrome, dermatomyositis, inclusion body myositis, juvenile myositis, polymyositis, systemic sclerosis, diabetes, Hashimoto's disease, autoimmune adrenal insufficiency, anemia, multiple sclerosis, rheumatic carditis, psoriasis, chronic rheumatism, vitiligo, alopecia areata, hidradenitis suppurativa, celiac disease, graft versus host disease (GVHD), myocardial infarction, and a Type-1 interferonopathy.

9. The use of claim 8, wherein the autoimmune disease is Sjögren's syndrome, dermatomyositis, vitiligo, polymyositis, systemic sclerosis, hidradenitis suppurativa, SLE or CLE.

10. The use of claim 1, wherein the ILT7 binding protein is an antibody comprising a variable heavy chain (VH) that is at least 85% identical to SEQ ID NO:1 and/or a variable light chain (VL) that is at least 85% identical to SEQ ID NO:2.

11. The use of claim 1, wherein the ILT7-binding protein is an antibody comprising a heavy chain variable region (VH) of SEQ ID NO:1 and a light chain variable region (VL) of SEQ ID NO:2.

12. The use of any one of claims 1-11, wherein the ILT7-binding protein is an antibody that is is afucosylated.

13. The use of any one of claims 1-12, wherein the pharmaceutically effective amount ranges from 0.1 mg to 1000 mg.

14. The use of claim 13, wherein the pharmaceutically effective amount of the ILT7-binding protein is 1 mg, 5 mg, 15 mg, 50 mg, 100 mg, or 150 mg.

15. The use of any one of claims 6-14, wherein the level of type I IFNGS is reduced at least 50% as compared to the level prior to administration of the ILT7-binding protein that is to be administered.

16. Use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for treating an autoimmune disorder in a subject in need thereof, wherein a pharmaceutically effective amount of the ILT7-binding protein is to be administered to the subject, wherein the pharmaceutically effective amount of the ILT7-binding protein is about 1 mg, about 5 mg, about 15 mg, about 50 mg, about 100 mg, or about 150 mg,

wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

17. The use of claim 16, wherein the pharmaceutically effective amount of the ILT7-binding protein is 50 mg.

18. The use of claim 16, wherein the pharmaceutically effective amount of the ILT7-binding protein is 150 mg.

19. The use of any one of claims 16-18, wherein the autoimmune disease is selected from the group consisting of systemic lupus erythematosus (SLE), lupus nephritis, cutaneous lupus erythematosus (CLE), Sjögren's syndrome, dermatomyositis, inclusion body myositis, juvenile myositis, polymyositis, systemic sclerosis, diabetes, Hashimoto's disease, autoimmune adrenal insufficiency, anemia, multiple sclerosis, rheumatic carditis, psoriasis, chronic rheumatism, vitiligo, alopecia areata, hidradenitis suppurativa, celiac disease, graft versus host disease (GVHD), myocardial infarction, and a Type-1 interferonopathy.

20. Use of an immunoglobulin-like transcript 7 (ILT7)-binding protein in the manufacture of a medicament for treating an autoimmune disorder, wherein an effective amount of an ILT7 binding protein is to be administered to a subject in need thereof, wherein the medicament is effective in treating the autoimmune disorder as determined by detecting in a sample of the subject:

i. fewer plasmacytoid dendritic cells (pDCs) compared to a sample of the subject before the ILT7 binding protein is to be administered; or

ii. reduced mRNA expression from two or more genes selected from the group consisting of: SPATS2L, EPSTI1, HERC5, IFI27, IFI44, IFI44L, IFI6, IFIT1, IFIT3, ISG15, LAMP3,

LY6E, MX1, OAS1, OAS2, OAS3, PLSCR1, RSAD2, RTP4, SIGLEC1, and USP18, compared to the mRNA expression level of the two or more genes in a sample of the subject before the ILT7 binding protein is to be administered,

wherein the ILT7-binding protein is an antibody comprising heavy chain Complementarity-Determining Regions (HCDRs) HCDR1, HDR2, HCDR3, and light chain Complementarity Determining Regions (LCDRs) LCDR1, LCDR2, and LCDR3 comprising the amino acid sequences of SEQ ID NOs: 3, 4, 5, 6, 7, and 8, respectively.

21. The use of claim 20, wherein the antibody comprises a variable heavy chain (VH) that is at least 85% identical to SEQ ID NO:1 and/or a variable light chain (VL) that is at least 85% identical to SEQ ID NO:2.

22. The use of claim 21, wherein the VH comprises the polypeptide of SEQ ID NO:1, and wherein the VL comprises the polypeptide of SEQ ID NO: 2.

23. The use of claim 20, wherein the autoimmune disorder is selected from the group consisting of: systemic lupus erythematosus (SLE), lupus nephritis, cutaneous lupus erythematosus (CLE), Sjögren's syndrome, dermatomyositis, inclusion body myositis, juvenile myositis, polymyositis, systemic sclerosis, diabetes, Hashimoto's disease, autoimmune adrenal insufficiency, anemia, multiple sclerosis, rheumatic carditis, psoriasis, chronic rheumatism, vitiligo, alopecia areata, hidradenitis suppurativa, celiac disease, graft versus host disease (GVHD), myocardial infarction, and a Type-1 interferonopathy.