

a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 53  
and

a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 54;

a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 62

and

a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 63;

a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 71

and

a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 72;

a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 80

and

a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 81.

In another aspect, the present disclosure relates to a nucleic acid molecule encoding the  
antagonistic antigen binding protein as described herein. In another example, the present  
disclosure relates to a nucleic acid encoding the antagonistic antigen binding protein as  
described herein.

In another aspect, the present disclosure relates to a recombinant expression vector  
comprising a nucleic acid molecule as described herein.

In another aspect, the present disclosure relates to a host cell comprising the vector as  
described herein.

In another aspect, the present disclosure relates to a method of making the antagonistic  
antigen binding protein as described herein comprising the step of preparing said antigen  
binding protein from a host cell expressing said antigen binding protein.

In another example, the present disclosure relates to an antagonistic antigen binding  
protein produced by the expression of recombinant DNA in the host cell as described herein.

In a further aspect, the present disclosure relates to a pharmaceutical composition  
comprising at least one antagonistic antigen binding protein as described herein, the nucleic  
acid molecule as described herein, or the vector as described herein and a pharmaceutically  
acceptable carrier, preferably wherein the composition comprises at least one further active  
agent. In another example, the present disclosure relates to a pharmaceutical composition  
comprising at least one antagonistic antigen binding protein as described herein, the nucleic  
acid as described herein or the vector as described herein and a pharmaceutically acceptable  
carrier.

In another aspect, the present disclosure relates to a kit comprising the pharmaceutical  
composition as described herein and optionally at least one further active agent.

In another aspect, the present disclosure refers to the antagonistic antigen binding protein as described herein, the nucleic acid molecule as described herein, the vector as described herein, or the pharmaceutical composition as described herein for use in therapy.

In another example, the present disclosure relates to the antagonistic antigen binding protein as described herein, the nucleic acid as described herein, the vector as described herein or the pharmaceutical composition as described herein for use in the treatment of cancer and/or chronic infectious disease.

In a further aspect, the present disclosure refers to use of the antagonistic antigen binding protein as described herein, the nucleic acid molecule as described herein, the vector as described herein, or the pharmaceutical composition as described herein in the manufacture of a medicament for treating cancer and/or chronic infectious disease, preferably wherein

- (i) the cancer is selected from the group consisting of:
  - (a) Malignant neoplasms of lip, oral cavity and pharynx; and/or
  - (b) Malignant neoplasms of digestive organs; and/or
  - (c) Malignant neoplasms of respiratory and intrathoracic organs; and/or
  - (d) Malignant neoplasms of bone and articular cartilage; and/or
  - (e) Melanoma and other malignant neoplasms of skin; and/or
  - (f) Malignant neoplasms of mesothelial and soft tissue; and/or
  - (g) Malignant neoplasm of breast; and/or
  - (h) Malignant neoplasms of female genital organs; and/or
  - (i) Malignant neoplasms of male genital organs; and/or
  - (j) Malignant neoplasms of urinary tract; and/or
  - (k) Malignant neoplasms of eye, brain and other parts of central nervous system; and/or
  - (l) Malignant neoplasms of thyroid and other endocrine glands; and/or
  - (m) Malignant neoplasms of lymphoid and hematopoietic tissue; and/or
- (ii) the chronic infectious disease is selected from the group consisting of HBV, HCV, HIV, HSV, HPV, EBV, CMV and Chlamydia.

In a further aspect, the present disclosure refers to use of the antagonistic antigen binding protein as described herein, the nucleic acid molecule as described herein, the vector as described herein, or the pharmaceutical composition as described herein in the manufacture of a medicament for use in combination therapy for treating cancer and/or chronic infectious

disease, wherein said medicament is to be administered in combination with at least one further active agent to a subject in need thereof, preferably, wherein the at least one further active agent and the antagonistic antigen binding protein as described herein, the nucleic acid molecule as described herein, the vector as described herein, or the pharmaceutical composition as described  
 5 herein are to be administered either simultaneously or sequentially or a combination thereof, preferably wherein

(i) the cancer is selected from the group consisting of:

(a) Malignant neoplasms of lip, oral cavity and pharynx; and/or

(b) Malignant neoplasms of digestive organs; and/or

10 (c) Malignant neoplasms of respiratory and intrathoracic organs; and/or

(d) Malignant neoplasms of bone and articular cartilage; and/or

(e) Melanoma and other malignant neoplasms of skin; and/or

(f) Malignant neoplasms of mesothelial and soft tissue; and/or

(g) Malignant neoplasm of breast; and/or

15 (h) Malignant neoplasms of female genital organs; and/or

(i) Malignant neoplasms of male genital organs; and/or

(j) Malignant neoplasms of urinary tract; and/or

(k) Malignant neoplasms of eye, brain and other parts of central nervous system;  
 and/or

20 (l) Malignant neoplasms of thyroid and other endocrine glands; and/or

(m) Malignant neoplasms of lymphoid and hematopoietic tissue; and/or

(ii) the chronic infectious disease is selected from the group consisting of HBV, HCV, HIV, HSV, HPV, EBV, CMV and Chlamydia.

## 25 List of Figures

In the following, the content of the figures comprised in this specification is described. In this context please also refer to the detailed description of the invention above and/or below.

**Figure 1: Immunome screening.** The screening procedure started from a universal cycle, common to the different targets, performed by panning the unselected library on activated  
 30 PBMCs (inner circle). Each divergent circle sector describes the enrichment profiles for the best ten scFv clones of the indicated targets, scored according to their counts per million value. The lines within each sector connect the individual enrichments, obtained after cycle 2 (small

## Claims

1. An antagonistic antigen binding protein that specifically binds to PD-L1, wherein said antigen binding protein comprises
  - 5 i) a CDRH1 comprising or consisting of the amino acid sequence of SEQ ID NO: 22  
and  
a CDRL1 comprising or consisting of the amino acid sequence of SEQ ID NO: 23,  
a CDRH2 comprising or consisting of the amino acid sequence of SEQ ID NO: 24  
and  
10 a CDRL2 comprising or consisting of the amino acid sequence of SEQ ID NO: 25,  
a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 26  
and  
a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 27;
  - 15 ii) a CDRH1 comprising or consisting of the amino acid sequence of SEQ ID NO: 31  
and  
a CDRL1 comprising or consisting of the amino acid sequence of SEQ ID NO: 32,  
a CDRH2 comprising or consisting of the amino acid sequence of SEQ ID NO: 33  
and  
20 a CDRL2 comprising or consisting of the amino acid sequence of SEQ ID NO: 34,  
a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 35  
and  
a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 36;
  - 25 iii) a CDRH1 comprising or consisting of the amino acid sequence of SEQ ID NO: 22  
and  
a CDRL1 comprising or consisting of the amino acid sequence of SEQ ID NO: 23,  
a CDRH2 comprising or consisting of the amino acid sequence of SEQ ID NO: 24  
and  
30 a CDRL2 comprising or consisting of the amino acid sequence of SEQ ID NO: 25,  
a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 89  
and  
a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 27;
  - iv) a CDRH1 comprising or consisting of the amino acid sequence of SEQ ID NO: 22  
and  
a CDRL1 comprising or consisting of the amino acid sequence of SEQ ID NO: 23,

- a CDRH2 comprising or consisting of the amino acid sequence of SEQ ID NO: 24  
and  
a CDRL2 comprising or consisting of the amino acid sequence of SEQ ID NO: 25,  
a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 98  
and  
a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 27;
- 5 v) a CDRH1 comprising or consisting of the amino acid sequence of SEQ ID NO: 22  
and  
a CDRL1 comprising or consisting of the amino acid sequence of SEQ ID NO: 23,  
10 a CDRH2 comprising or consisting of the amino acid sequence of SEQ ID NO: 24  
and  
a CDRL2 comprising or consisting of the amino acid sequence of SEQ ID NO: 25,  
a CDRH3 comprising or consisting of the amino acid sequence of SEQ ID NO: 107  
and  
15 a CDRL3 comprising or consisting of the amino acid sequence of SEQ ID NO: 27.
2. The antagonistic antigen binding protein of claim 1, wherein said antigen binding protein comprises
- 20 i) a light chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 21 and  
a heavy chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 20;
- 25 ii) a light chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 30 and  
a heavy chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 29;
- 30 iii) a light chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 21 and  
a heavy chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 83;
- iv) a light chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 21 and  
a heavy chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 92;

- v) a light chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 21 and  
a heavy chain variable domain having a sequence with at least 90% identity to SEQ ID NO: 101.

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3. The antagonistic antigen binding protein of any one of the preceding claims, wherein
  - (a) the antigen binding protein is an antibody, or an antigen-binding fragment thereof, preferably, wherein the antibody is selected from the group consisting of a human antibody, a humanized antibody, chimeric antibody, a monoclonal antibody, a multispecific antibody, a recombinant antibody, a single chain antibody, an IgG1 antibody, an IgG2 antibody, an IgG3 antibody, and an IgG4 antibody; or wherein the antigen-binding fragment is selected from the group consisting of a single chain variable fragment antibody, a diabody, a Fab fragment, an F(ab)<sub>2</sub> fragment; and/or
  - (b) the antigen binding protein has at least one of the following characteristics:
    - (i) binds to PD-L1 with a K<sub>d</sub> of less than 100 nM, of less than 50 nM, of less than 10 nM or of less than 1 nM;
    - (ii) stimulates T cell proliferation;
    - (iii) induces the proliferation of lymphocytes;
    - (iv) induces secretion of IL-2 and/or IFN $\gamma$ ; and/or
    - (v) reduces tumor volume by at least 50%, at least 60%, at least 70%, at least 80% or at least 90% compared to baseline value.

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4. A nucleic acid molecule encoding the antagonistic antigen binding protein of any one of the preceding claims.

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5. A recombinant expression vector comprising a nucleic acid molecule according to claim 4.

6. A host cell comprising the vector of claim 5.

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7. A method of making the antagonistic antigen binding protein of any one of claims 1-3, comprising the step of preparing said antigen binding protein from a host cell expressing said antigen binding protein.

8. A pharmaceutical composition comprising at least one antagonistic antigen binding protein according to any one of claims 1 to 3, the nucleic acid molecule according to claim 4, or the vector according to claim 5 and a pharmaceutically acceptable carrier, preferably wherein the composition comprises at least one further active agent.

9. A kit comprising the pharmaceutical composition of claim 8 and optionally at least one further active agent.

10. The antagonistic antigen binding protein of any one of claims 1 to 3, the nucleic acid molecule of claim 4, the vector of claim 5, or the pharmaceutical composition of claim 8 for use in therapy.

11. Use of the antagonistic antigen binding protein of any one of claims 1 to 3, the nucleic acid molecule of claim 4, the vector of claim 5, or the pharmaceutical composition of claim 8 in the manufacture of a medicament for treating cancer and/or chronic infectious disease, preferably wherein

(i) the cancer is selected from the group consisting of:

(a) Malignant neoplasms of lip, oral cavity and pharynx; and/or

(b) Malignant neoplasms of digestive organs; and/or

(c) Malignant neoplasms of respiratory and intrathoracic organs; and/or

(d) Malignant neoplasms of bone and articular cartilage; and/or

(e) Melanoma and other malignant neoplasms of skin; and/or

(f) Malignant neoplasms of mesothelial and soft tissue; and/or

(g) Malignant neoplasm of breast; and/or

(h) Malignant neoplasms of female genital organs; and/or

(i) Malignant neoplasms of male genital organs; and/or

(j) Malignant neoplasms of urinary tract; and/or

(k) Malignant neoplasms of eye, brain and other parts of central nervous system; and/or

(l) Malignant neoplasms of thyroid and other endocrine glands; and/or

(m) Malignant neoplasms of lymphoid and hematopoietic tissue; and/or

(ii) the chronic infectious disease is selected from the group consisting of HBV, HCV, HIV, HSV, HPV, EBV, CMV and Chlamydia.

12. Use of the antagonistic antigen binding protein of any one of claims 1 to 3, the nucleic acid molecule of claim 4, the vector of claim 5, or the pharmaceutical composition of claim 8 in the manufacture of a medicament for use in combination therapy for treating cancer and/or chronic infectious disease, wherein said medicament is to be administered in combination with at least one further active agent to a subject in need thereof, preferably,

wherein the at least one further active agent and the antagonistic antigen binding protein of any one of claims 1 to 3, the nucleic acid molecule of claim 4, the vector of claim 5, or the pharmaceutical composition of claim 8 are to be administered either simultaneously or sequentially or a combination thereof, preferably wherein

(i) the cancer is selected from the group consisting of:

- (a) Malignant neoplasms of lip, oral cavity and pharynx; and/or
- (b) Malignant neoplasms of digestive organs; and/or
- (c) Malignant neoplasms of respiratory and intrathoracic organs; and/or
- (d) Malignant neoplasms of bone and articular cartilage; and/or
- (e) Melanoma and other malignant neoplasms of skin; and/or
- (f) Malignant neoplasms of mesothelial and soft tissue; and/or
- (g) Malignant neoplasm of breast; and/or
- (h) Malignant neoplasms of female genital organs; and/or
- (i) Malignant neoplasms of male genital organs; and/or
- (j) Malignant neoplasms of urinary tract; and/or
- (k) Malignant neoplasms of eye, brain and other parts of central nervous system; and/or
- (l) Malignant neoplasms of thyroid and other endocrine glands; and/or
- (m) Malignant neoplasms of lymphoid and hematopoietic tissue; and/or

(ii) the chronic infectious disease is selected from the group consisting of HBV, HCV, HIV, HSV, HPV, EBV, CMV and Chlamydia.