~~[CLAIMS]~~

~~[Claim 1]~~

~~A single strand oligonucleotide comprising sequence motifs 5' tcgcaacgttt 3' (SEQ ID NO:1) and 5' cgacg 3'.~~

~~[Claim 2]~~

~~The oligonucleotide according to claim 1, wherein the oligonucleotide comprises a nucleotide sequence motif 5' tcgcaacgttt n cgacg n cg nn cg 3' (SEQ ID NO:2), wherein n denotes any base.~~

~~[Claim 3]~~

~~The oligonucleotide according to claim 1 or 2, wherein the total base number is from 20 to 25.~~

~~[Claim 4]~~

~~The oligonucleotide according to any one of claims 1 3, wherein the oligonucleotide comprises a sequence motif selected from the group consisting of the followings:~~

- ~~5' tcgcaacgtttgcgacgtcggtcga (SEQ ID NO:54);~~
- ~~5' tcgcaacgtttgcgacggcgctcga (SEQ ID NO:55);~~
- ~~5' tcgcaacgtttgcgacgtcgttcga (SEQ ID NO:56);~~
- ~~5' tcgcaacgtttgcgacggcgttcga (SEQ ID NO:57);~~
- ~~5' tcgcaacgtttgcgacgtcgttcg (SEQ ID NO:58);~~
- ~~5' tcgcaacgtttgcgacgtcgttcgg (SEQ ID NO:59);~~
- ~~5' tcgcaacgtttacgacgtcggtcga (SEQ ID NO:60);~~
- ~~5' tcgcaacgtttacgacggcgctcga (SEQ ID NO:61);~~
- ~~5' tcgcaacgtttacgacgtcgttcga (SEQ ID NO:62); and~~
- ~~5' tcgcaacgtttacgacggcgttcga (SEQ ID NO:63).~~

~~[Claim 5]~~

~~The oligonucleotide according to any one of claims 1 4, wherein the internucleotide linkage(s) of the oligonucleotide is partially or fully chemically modified.~~

~~[Claim 6]~~

~~The oligonucleotide according to claim 5, wherein the chemically modified internucleotide linkage is phosphorothioated.~~

~~[Claim 7]~~

~~The oligonucleotide according to claim 6, wherein the oligonucleotide comprises a partially phosphorothioated oligonucleotide stretch selected from the group consisting of~~

~~5’-tCgcaacgtttgcgacgtcgttcgA-3’ (SEQ ID NO:16);~~

~~5’-tCgcaaCgtttgcgacgtcgttcgA-3’ (SEQ ID NO:17);~~

~~5’-tCgCaaCgtttgcgacgtcgttcgA-3’ (SEQ ID NO:18);~~

~~5’-tCgCaacgtttgCgaCgtcgttcgA-3’ (SEQ ID NO:19);~~

~~5’-tCgCaacgtttgCgaCgtcgttCgA-3’ (SEQ ID NO:20);~~

~~5’-tCgCaaCgtttgcgacgtCgttCgA-3’ (SEQ ID NO:21);~~

~~5’-tCgCaaCgtttgCgaCgtCgttCgA-3’ (SEQ ID NO:22);~~

~~5’-tCgCaaCgtttgcgacgtCggtCgA-3’ (SEQ ID NO:23);~~

~~5’-tCgCaaCgtttgcgacggCgctCgA-3’ (SEQ ID NO:24);~~

~~5’-tCgCaaCgtttgcgacggCgttCgA-3’ (SEQ ID NO:26);~~

~~5’-tCgCaaCgtttgcgacgcCgttCgA-3’ (SEQ ID NO:27);~~

~~5’-tCgCaaCgtttgcgacggCgtaCgA-3’ (SEQ ID NO:28);~~

~~5’-tCgCaaCgtttgcgacggCgtgCgA-3’ (SEQ ID NO:29);~~

~~5’-tCgCaaCgtttacgacgtCggtCgA-3’ (SEQ ID NO:30);~~

~~5’-tCgCaaCgtttacgacggCgctCgA-3’ (SEQ ID NO:31);~~

~~5’-tCgCaaCgtttacgacgtCgttCgA-3’ (SEQ ID NO:32);~~

~~5’-tCgCaaCgtttGcgacgtCggtCgA-3’ (SEQ ID NO:33);~~

~~5’-tCgCaaCgtttAcgacgtCggtCgA-3’ (SEQ ID NO:34);~~

~~5’-tCgCaaCgtttGcgacggCgctCgA-3’ (SEQ ID NO:35);~~

~~5’-tCgCaaCgtttAcgacggCgctCgA-3’ (SEQ ID NO:36);~~

~~5’-tCgCaaCgtttGcgacgtCgttCgA-3’ (SEQ ID NO:37);~~

~~5’-tCgCaaCgtttAcgacgtCgttCgA-3’ (SEQ ID NO:38);~~

~~5’-tCgCaaCgtttGcgacgtCggtCgG-3’ (SEQ ID NO:39);~~

~~5’-tCgCaaCgtttAcgacgtCggtCgG-3’ (SEQ ID NO:40);~~

~~5’-tCgCaaCgtttGcgacggCgctCgG-3’ (SEQ ID NO:41);~~

~~5’-tCgCaaCgtttAcgacggCgctCgG-3’ (SEQ ID NO:42);~~

~~5’-tCgCaaCgtttGcgacgtCgttCgG-3’ (SEQ ID NO:43); and~~

~~5’-tCgCaaCgtttAcgacgtCgttCgG-3’ (SEQ ID NO:44);~~

~~wherein the capital letter denotes a nucleoside with no modified internucleotide linkage at 3’, and the small letter denotes a nucleoside with an internucleotide linkage with phosphorothioation at 3’.~~

~~[Claim 8]~~

~~The oligonucleotide according to claim 6, wherein the oligonucleotide comprises a~~

partially phosphorothioated oligonucleotide stretch selected from the group consisting of,

5’-tCgCaaCgtttGcgacgtCggtCgA-3’ (SEQ ID NO:33);

5’-tCgCaaCgtttAcgacgtCggtCgA-3’ (SEQ ID NO:34);

5’-tCgCaaCgtttGcgacggCgctCgA-3’ (SEQ ID NO:35); and

5’-tCgCaaCgtttAcgacggCgctCgA-3’ (SEQ ID NO:36),

wherein the capital letter denotes a nucleoside with no modified internucleotide linkage at 3’, and the small letter denotes a nucleoside with an internucleotide linkage with phosphorothioation at 3’.

[Claim 9]

The oligonucleotide according to any one of claims 1-8, wherein the oligonucleotide is constituted with DNA.

[Claim 10]

The oligonucleotide according to any one of claims 1-9, wherein the oligonucleotide is further deleted with, replaced with, or added with one or several nucleotide(s).

[Claim 11]

The oligonucleotide according to any one of claims 1-10, wherein the oligonucleotide is comprised in an expression vector.

[Claim 12]

The oligonucleotide according to any one of claims 1-10, wherein the oligonucleotide is circularized.

[Claim 13]

The oligonucleotide according to any one of claims 1-10, wherein the oligonucleotide is linear.

[Claim 14]

The oligonucleotide according to claim 13, wherein 3’ end of the linear oligonucleotide has no phosphoric acid.

[Claim 15]

A double-strand oligonucleotide comprising the oligonucleotide according to any one of claims 1-10 and a complementary strand oligonucleotide thereof.

[Claim 16]

The oligonucleotide according to any one of claims 1-15, which is conjugated with at least one active molecule.

[Claim 17]

~~The oligonucleotide according to claim 16, wherein the active molecule is selected from the group consisting of (poly)peptides/antibodies and nucleic acids/oligonucleotides.~~

~~[Claim 18]~~

~~The oligonucleotide according to claim 16 or 17, wherein the conjugation is made through a linker.~~

~~[Claim 19]~~

~~The oligonucleotide according to claim 18, wherein the linker is selected from the group consisting of glycerol, (S) (-) 1,2,4-Butanetriol, 1,3,5-Pentanetriol, cis,cis-1,3,5, Cyclohexanetriol, cistrans 1,3,5-Cyclohexanetriol, 1,3,5-tris (2-Hydroxyethyl)isocyanurate, Tetraethyleneglycol, and Hexaethyleneglycol, diols such as 1,3-propane diol or dodecane-1,12-diol, cyclohexanediol, cholesterol, nitroindol, triethylene glycol, hexaethylene glycol, d-spacer, PEG-spacer and alkyl linker.~~

~~[Claim 20]~~

~~A pharmaceutical composition, comprising a therapeutically effective amount of the oligonucleotide according to any one of claims 1- 19 and a pharmaceutical acceptable carrier.~~

~~[Claim 21]~~

~~A pharmaceutical composition for prophylaxis or treatment of a target disease or disorder, comprising a therapeutically effective amount of the oligonucleotide according to any one of claims 1- 19, wherein the target disease or disorder is any one selected from the group consisting of neoplasms, infectious disease, disease related to Th2/Th17, primary immunodeficiency disease, and Post-traumatic stress disorder (PTSD).~~

~~[Claim 22]~~

~~An agent for modulation of immune response in a subject, comprising a therapeutically effective amount of the oligonucleotide according to any one of claims 1- 19.~~

~~[Claim 23]~~

~~The pharmaceutical composition according to claim 21, wherein the target disease or disorder is neoplasms selected from the group consisting of malignant neoplasm, epithelial neoplasm or hematopoietic organ tumor, sarcoma, mesothelioma, benign tumor, dysplasia and metaplasia.~~

~~[Claim 24]~~

~~The pharmaceutical composition according to claim 21, wherein the target disease or disorder is an infectious disease caused by microorganisms including viruses, bacteria, and fungi~~

~~[Claim 25]~~

~~The pharmaceutical composition according to claim 21, wherein the target disease or disorder is a disease related to Th2/Th17 selected from the group consisting of asthma, allergies, multiple sclerosis, Inflammatory Bowel Disease including ulcerative colitis and Crohn disease, cutaneous lichen planus and Alzheimer's disease.~~

~~[Claim 26]~~

~~The pharmaceutical composition according to claim 21, wherein the target disease or disorder is a primary immunodeficiency disease caused by IRAK4 deficiency, MyD88 deficiency, Unc93B deficiency or mutations in TLRs.~~

~~[Claim 27]~~

~~The pharmaceutical composition according to claim 20 or 21, wherein the composition further comprises at least one active ingredient.~~

~~[Claim 28]~~

~~The pharmaceutical composition according to claim 20 or 21, wherein the composition is co-administered with at least one active ingredient.~~

~~[Claim 29]~~

~~The pharmaceutical composition according to claim 27 or 28, wherein the active ingredient is selected from the group consisting of anti-cancer drugs; molecular targeting drugs including tyrosine kinase inhibitors, angiogenesis inhibitors and proteasome inhibitors; anti-cancer antibody drugs; cytokines; vaccines; antibacterial agents; antifungul agents; antivirus agents; antiparasitic drugs; antibody drugs to neutralize toxin; agonists of other TLRs and combination thereof.~~

~~[Claim 30]~~

~~The pharmaceutical composition according to claim 20 or 21, wherein the composition is administered to a subject through a dosage route selected from the group consisting of enteral administration, parenteral administration, topical administration and inhalation.~~

~~[Claim 31]~~

~~The pharmaceutical composition according to claim 30, wherein the subject is human.~~

~~[Claim 32]~~

~~The pharmaceutical composition according to claim 31, wherein the composition is~~

~~administered to the subject to at from 2 to 8 mg/day.~~

~~[Claim 33]~~

~~Use of the oligonucleotides according to any one of claims 1-19 in the manufacture of a medicament for treatment or prophylaxis of any one selected from the group consisting of neoplasms, infection, disease related to Th2/Th17, primary immunodeficiency disease, and Post traumatic stress disorder (PTSD).~~

~~[Claim 34]~~

~~The pharmaceutical composition according to claim 20 or 21, wherein the composition is administered before or after adoptive immune cell therapies or surgical treatments including radiation therapy, cryoablation, radiofrequency ablation and photodynamic therapy (PDT).~~

【Claims】

1. A single strand oligonucleotide comprising a nucleotide sequence motif 5'-tcgcaacgttt-n-cgacg-n-cg-nn-cg -3' (SEQ ID NO:2), wherein n denotes any base.

2. The oligonucleotide according to claim 1, wherein the total base number is from 20 to 25.

3. The oligonucleotide according to claim 1 or 2, wherein the oligonucleotide comprises a sequence motif selected from the group consisting of the followings:

5'-tcgcaacgtttgcgacgtcggtcga (SEQ ID NO:54);
5'-tcgcaacgtttgcgacggcgctcga (SEQ ID NO:55);
5'-tcgcaacgtttgcgacgtcgttcga (SEQ ID NO:56);
5'-tcgcaacgtttgcgacggcgttcga (SEQ ID NO:57);
5'-tcgcaacgtttgcgacgtcgttcg (SEQ ID NO:58);
5'-tcgcaacgtttgcgacgtcgttcgg (SEQ ID NO:59);
5'-tcgcaacgtttacgacgtcggtcga (SEQ ID NO:60);
5'-tcgcaacgtttacgacggcgctcga (SEQ ID NO:61);
5'-tcgcaacgtttacgacgtcgttcga (SEQ ID NO:62); and
5'-tcgcaacgtttacgacggcgttcga (SEQ ID NO:63).

4. The oligonucleotide according to any one of claims 1-3, wherein the internucleotide linkage(s) of the oligonucleotide is partially or fully chemically modified.

5. The oligonucleotide according to claim 4, wherein the chemically-modified internucleotide linkage is phosphorothioated.

6. The oligonucleotide according to claim 5, wherein the oligonucleotide comprises a partially phosphorothioated oligonucleotide stretch selected from the group consisting of

5'-tCgcaacgtttgcgacgtcgttcgA-3' (SEQ ID NO:16);
5'-tCgcaaCgtttgcgacgtcgttcgA-3' (SEQ ID NO:17);
5'-tCgCaaCgtttgcgacgtcgttcgA-3' (SEQ ID NO:18);
5'-tCgCaacgtttgCgaCgtcgttcgA-3' (SEQ ID NO:19);
5'-tCgCaacgtttgCgaCgtcgttCgA-3' (SEQ ID NO:20);
5'-tCgCaaCgtttgcgacgtCgttCgA-3' (SEQ ID NO:21);
5'-tCgCaaCgtttgCgaCgtCgttCgA-3' (SEQ ID NO:22);
5'-tCgCaaCgtttgcgacgtCggtCgA-3' (SEQ ID NO:23);
5'-tCgCaaCgtttgcgacggCgctCgA-3' (SEQ ID NO:24);
5'-tCgCaaCgtttgcgacggCgttCgA-3' (SEQ ID NO:26);
5'-tCgCaaCgtttgcgacgcCgttCgA-3' (SEQ ID NO:27);
5'-tCgCaaCgtttgcgacggCgtaCgA-3' (SEQ ID NO:28);
5'-tCgCaaCgtttgcgacggCgtgCgA-3' (SEQ ID NO:29);
5'-tCgCaaCgtttacgacgtCggtCgA-3' (SEQ ID NO:30);
5'-tCgCaaCgtttacgacggCgctCgA-3' (SEQ ID NO:31);
5'-tCgCaaCgtttacgacgtCgttCgA-3' (SEQ ID NO:32);
5'-tCgCaaCgtttGcgacgtCggtCgA-3' (SEQ ID NO:33);
5'-tCgCaaCgtttAcgacgtCggtCgA-3' (SEQ ID NO:34);
5'-tCgCaaCgtttGcgacggCgctCgA-3' (SEQ ID NO:35);
5'-tCgCaaCgtttAcgacggCgctCgA-3' (SEQ ID NO:36);
5'-tCgCaaCgtttGcgacgtCgttCgA-3' (SEQ ID NO:37);
5'-tCgCaaCgtttAcgacgtCgttCgA-3' (SEQ ID NO:38);
5'-tCgCaaCgtttGcgacgtCggtCgG-3' (SEQ ID NO:39);

5’-tCgCaaCgtttAcgacgtCggtCgG-3’ (SEQ ID NO:40);
5’-tCgCaaCgtttGcgacggCgctCgG-3’ (SEQ ID NO:41);
5’-tCgCaaCgtttAcgacggCgctCgG-3’ (SEQ ID NO:42);
5’-tCgCaaCgtttGcgacgtCgttCgG-3’ (SEQ ID NO:43); and
5’-tCgCaaCgtttAcgacgtCgttCgG-3’ (SEQ ID NO:44);
wherein the capital letter denotes a nucleoside with no modified internucleotide linkage at 3’, and the small letter denotes a nucleoside with an internucleotide linkage with phosphorothioation at 3’.

7. The oligonucleotide according to claim 5, wherein the oligonucleotide comprises a partially phosphorothioated oligonucleotide stretch selected from the group consisting of,
5’-tCgCaaCgtttgcgacggCgctCgA-3’ (SEQ ID NO:24);
5’-tCgCaaCgtttGcgacgtCggtCgA-3’ (SEQ ID NO:33);
5’-tCgCaaCgtttAcgacgtCggtCgA-3’ (SEQ ID NO:34);
5’-tCgCaaCgtttGcgacggCgctCgA-3’ (SEQ ID NO:35); and
5’-tCgCaaCgtttAcgacggCgctCgA-3’ (SEQ ID NO:36),
wherein the capital letter denotes a nucleoside with no modified internucleotide linkage at 3’, and the small letter denotes a nucleoside with an internucleotide linkage with phosphorothioation at 3’.

8. The oligonucleotide according to any one of claims 1-7, wherein the oligonucleotide is constituted with DNA.

9. The oligonucleotide according to any one of claims 1-8, wherein the oligonucleotide is further deleted with, replaced with, or added with one or several nucleotide(s).

10. The oligonucleotide according to any one of claims 1-9, which is conjugated with at least one active molecule.

11. The oligonucleotide according to claim 10, wherein the active molecule is selected from the group consisting of (poly)peptides/antibodies and nucleic acids/oligonucleotides.

12. A pharmaceutical composition, comprising a therapeutically effective amount of the oligonucleotide according to any one of claims 1 - 11 or a therapeutically effective amount of a double-strand oligonucleotide comprising the oligonucleotide according to any one of claims 1 - 11; and a pharmaceutical acceptable carrier.

13. The pharmaceutical composition according to claim 12, for prophylaxis or treatment of a target disease or disorder, wherein the target disease or disorder is any one selected from the group consisting of neoplasms, infectious disease, disease related to Th2/Th17, primary immunodeficiency disease, and Post-traumatic stress disorder (PTSD).

14. The pharmaceutical composition according to claim 12 or 13, wherein the composition further comprises at least one active ingredient.

15. The pharmaceutical composition according to any one of claim 12 or 13, wherein the composition is to be co-administered with at least one active ingredient.

16. The pharmaceutical composition according to claim 14 or 15, wherein the active ingredient is selected from the group consisting of anti-cancer drugs; molecular targeting drugs including tyrosine kinase inhibitors, angiogenesis inhibitors and proteasome

inhibitors; anti-cancer antibody drugs; cytokines; vaccines; antibacterial agents; antifungul agents; antivirus agents; antiparasitic drugs; antibody drugs to neutralize toxin; agonists of other TLRs and combination thereof.

17. The pharmaceutical composition according to claim 13, wherein the target disease or disorder is

1) a neoplasm selected from the group consisting of malignant neoplasm, epithelial neoplasm or hematopoietic organ tumor, sarcoma, mesothelioma, benign tumor, dysplasia and metaplasia;.

2) an infectious disease caused by microorganisms including viruses, bacteria, and fungi;

3) a disease related to Th2/Th17 selected from the group consisting of asthma, allergies, multiple sclerosis, Inflammatory Bowel Disease including ulcerative colitis and Crohn disease, cutaneous lichen planus and Alzheimer's disease;or

4) a primary immunodeficiency disease caused by IRAK4 deficiency, MyD88 deficiency, Unc93B deficiency or mutations in TLRs.

18. The pharmaceutical composition according to claim 12 or 13, wherein the composition is to be administered before or after adoptive immune cell therapies or surgical treatments including radiation therapy, cryoablation, radiofrequency ablation and photodynamic therapy (PDT).

19. Use of the single strand oligonucleotide according to any one of claims 1-11 or a double-strand oligonucleotide comprising the single strand oligonucleotide according to any one of claims 1-11, in the manufacture of a medicament for treatment or prophylaxis of a target disease or disorder selected from the group consisting of neoplasms, infection, disease related to Th2/Th17, primary immunodeficiency disease, and Post traumatic stress disorder (PTSD).

20. The use according to 19, wherein the target disease or disorder is

1) a neoplasm selected from the group consisting of malignant neoplasm, epithelial neoplasm or hematopoietic organ tumor, sarcoma, mesothelioma, benign tumor, dysplasia and metaplasia;

2) an infectious disease caused by microorganisms including viruses, bacteria, or fungi;

3) a disease related to Th2/Th17 selected from the group consisting of asthma, atopic disease, Inflammatory Bowel Disease including ulcerative colitis and Crohn disease, cutaneous lichen planus and Alzheimer's disease; or

4) a primary immunodeficiency disease caused by IRAK4 deficiency, MyD88 deficiency, Unc93B deficiency or mutations in TLRs.