Claims

1. Aptamer for use in therapy of a subject by inhibiting or suppressing the activation of TLR9 in a cell, wherein the aptamer comprises a nucleic acid sequence of SEQ ID No. 1 (GGT TGG TGT GGT TGG) and/or a nucleic acid sequence being at least 80% identical to SEQ ID No. 1.

2. Aptamer for use according to claim 1, wherein the subject is a mammal, preferably wherein the subject is a human.

3. Aptamer for use according to any of the preceding claims, wherein the subject to be treated is showing TLR9 overexpression and/or overactivity of TLR9-mediated signaling.

4. Aptamer for use according to any of the preceding claims, wherein the subject to be treated is tested positive for TLR9 overexpression and/or overactivity of TLR9-mediated signaling.

5. Aptamer for use according to any of claims 3 or 4, wherein TLR9 overexpression and/or overactivity of TLR9-mediated signalling in a subject is given if the TLR9-mediated production of TNFα is increased over a reference value for healthy subjects.

6. Aptamer for use according to claim 5, wherein the value for the subject to be treated is determined using the method described in the description and is at least 50 pg/ml, preferably at least 75 pg/ml, more preferably at least 100 pg/ml, most preferably at least 125 pg/ml.

7. Aptamer for use according to any of the preceding claims, wherein the subject is having a disorder selected from an autoimmune disorder, an inflammatory disorder, an autoimmune connective tissue disease (ACTD) and/or a neurodegenerative disorder, preferably the disorder is selected from psoriasis, rheumatoid arthritis, alopecia universalis, acute disseminated encephalomyelitis, Addison's disease, allergy, ankylosing spondylitis, antiphospholipid antibody syndrome, arteriosclerosis, atherosclerosis, autoimmune hemolytic anemia, autoimmune hepatitis, Bullous pemphigoid, Chagas' disease, chronic obstructive pulmonary disease, coeliac disease, cutaneous lupus erythematosus (CLE), dermatomyositis, diabetes, dilated cardiomyopathy (DCM), endometriosis, Goodpasture's syndrome, Graves' disease, Guillain-Barre syndrome, Hashimoto's disease, hidradenitis suppurativa, idiopathic thrombocytopenic purpura,

inflammatory bowel disease, interstitial cystitis, morphea, multiple sclerosis (MS), myasthenia gravis, myocarditis, narcolepsy, neuromyotonia, pemphigus, pernicious anaemia, polymyositis, primary biliary cirrhosis, rheumatoid arthritis (RA), schizophrenia, Sjogren's syndrome, systemic lupus erythematosus (SLE), systemic sclerosis, temporal arteritis, vasculitis, vitiligo, vulvodynia, Wegener's granulomatosis, traumatic pain, neuropathic pain and acetaminophen toxicity,
alternatively wherein the subject is having tumour/cancer, preferably wherein the tumour/cancer is selected from the group consisting of breast cancer, cervical squamous cell carcinoma, gastric carcinoma, glioma, hepatocellular carcinoma, lung cancer, melanoma, prostate cancer, recurrent glioblastoma, recurrent non-Hodgkin lymphoma, colorectal cancer.

8. Use of the aptamer according to any of the preceding claims in the manufacture of a medicament for treating a disorder selected from an autoimmune disorder, an inflammatory disorder, an autoimmune connective tissue disease (ACTD) and/or a neurodegenerative disorder, preferably the disorder is selected from psoriasis, rheumatoid arthritis, alopecia universalis, acute disseminated encephalomyelitis, Addison's disease, allergy, ankylosing spondylitis, antiphospholipid antibody syndrome, arteriosclerosis, atherosclerosis, autoimmune hemolytic anemia, autoimmune hepatitis, Bullous pemphigoid, Chagas' disease, chronic obstructive pulmonary disease, coeliac disease, cutaneous lupus erythematosus (CLE), dermatomyositis, diabetes, dilated cardiomyopathy (DCM), endometriosis, Goodpasture's syndrome, Graves' disease, Guillain-Barre syndrome, Hashimoto's disease, hidradenitis suppurativa, idiopathic thrombocytopenic purpura, inflammatory bowel disease, interstitial cystitis, morphea, multiple sclerosis (MS), myasthenia gravis, myocarditis, narcolepsy, neuromyotonia, pemphigus, pernicious anaemia, polymyositis, primary biliary cirrhosis, rheumatoid arthritis (RA), schizophrenia, Sjogren's syndrome, systemic lupus erythematosus (SLE), systemic sclerosis, temporal arteritis, vasculitis, vitiligo, vulvodynia, Wegener's granulomatosis, traumatic pain, neuropathic pain and acetaminophen toxicity, alternatively wherein the subject is having tumour/cancer, preferably wherein the tumour/cancer is selected from the group consisting of breast cancer, cervical squamous cell carcinoma, gastric carcinoma, glioma, hepatocellular carcinoma, lung cancer, melanoma, prostate cancer, recurrent glioblastoma, recurrent non-Hodgkin lymphoma, colorectal cancer.

9. A method of inhibiting or suppressing the activation of TLR9 in a cell comprising contacting a cell expressing TLR9 with an aptamer, wherein the method is carried out *in vitro/ex vivo* and wherein the aptamer comprises a nucleic acid sequence of SEQ ID No. 1 (GGT TGG

TGT GGT TGG) and/or a nucleic acid sequence being at least 80% identical to SEQ ID No. 1.

10. The method of claim 9, wherein the method additionally comprises a previous step of testing the cell for TLR9 overexpression and/or overactivity of TLR9-mediated signaling.

11. The method according to any of claims 9 or 10, wherein the cell is a mammalian cell, preferably wherein the cell is a human cell.

12. Pharmaceutical composition comprising an aptamer for use according to any of claims 1 to 8 and at least one pharmaceutically acceptable excipient.

13. Kit comprising at least one aptamer for use according to any of claims 1 to 8 and a container.

14. The aptamer as defined in claim 1 when used in inhibiting or suppressing TLR9 activation, wherein the aptamer is used *in vitro/ex vivo*.