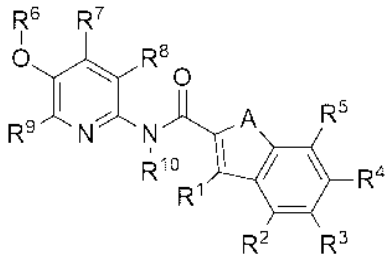
WHAT IS CLAIMED IS:

1. A compound represented by formula 1, an isomer thereof, a solvate thereof, a hydrate thereof or a pharmaceutically acceptable salt thereof:

[Formula 1]



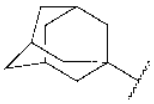
(In formula 1,

A is NR^a, O or S, wherein, the R^a is hydrogen, or straight chained or branched C_{1-5} alkyl;

R^1, R^2, R^3, R^4, and R^5 are independently hydrogen, halogen, straight chained or branched C_{1-5} alkyl, or straight chained or branched C_{1-5} alkoxy, wherein the alkyl and alkoxy may be independently substituted with one or more halogens;

R^6 is hydrogen, straight chained or branched C_{1-5} alkyl, $-(CH_2)mC(=O)NH(CH_2)nR^b$ or $-C(=O)R^c$, wherein the alkyl may be substituted with one or more halogens, and m and n are independently integers of 0 to 5,

R^b is hydrogen, straight chained or branched C_{1-10} alkyl, C_{3-10} cycloalkyl or C_{6-10} aryl,

R^c is adamantanyl (), 3 – 10 membered heterocycloalkyl containing one or more hetero atoms selected from the group consisting of N, O and S, C_{6-10} aryl, or 5 – 10 membered heteroaryl containing one or more hetero atoms selected from the group consisting of N, O and S, wherein the aryl and heteroaryl may be independently substituted with at least one selected from the group consisting of halogen, straight chained or branched C_{1-5} alkyl and straight chained or branched C_{1-5} alkoxy;

R^7, R^8, and R^9 are independently straight chained or branched C_{1-5} alkyl; and

R^{10} is hydrogen, or straight chained or branched C_{1-5} alkyl).

2. The compound, the isomer thereof, the solvate thereof, the hydrate thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein:

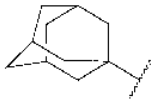
A is NR^a, O or S, wherein the R^a is hydrogen, or straight chained or branched C_{1-3} alkyl;

R^1, R^2, R^3, R^4, and R^5 are independently hydrogen, halogen, straight chained or branched C_{1-3} alkyl, or straight chained or branched C_{1-3} alkoxy, wherein the

alkyl and alkoxy may be independently substituted with one or more halogens;

R^6 is hydrogen, straight chained or branched C_{1-3} alkyl, $-(CH_2)mC(=O)NH(CH_2)nR^b$, or $-C(=O)R^c$, wherein the alkyl may be substituted with one or more halogens, and m and n are independently integers of 0 to 3,

R^b is hydrogen, straight chained or branched C_{1-6} alkyl, C_{3-8} cycloalkyl or phenyl,

R^c is adamantanyl (), 3 – 8 membered heterocycloalkyl containing one or more hetero atoms selected from the group consisting of N, O and S, phenyl, or 5 – 6 membered heteroaryl containing one or more hetero atoms selected from the group consisting of N, O and S, wherein the phenyl and heteroaryl may be independently substituted with at least one selected from the group consisting of halogen, straight chained or branched C_{1-3} alkyl and straight chained or branched C_{1-3} alkoxy;

R^7, R^8, and R^9 are independently straight chained or branched C_{1-3} alkyl; and

R^{10} is hydrogen, or straight chained or branched C_{1-3} alkyl.

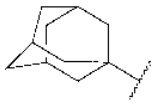
3. The compound, the isomer thereof, the solvate thereof, the hydrate thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein:

A is NR^a, O or S, wherein the R^a is hydrogen or methyl;

R^1, R^2, R^3, R^4, and R^5 are independently hydrogen, -Cl, -Br, -F, methyl, methoxy, $-CF_3$ or $-OCF_3$;

R^6 is hydrogen, methyl, $-(CH_2)mC(=O)NH(CH_2)nR^b$, or $-C(=O)R^c$, wherein m is 1, and n is 0 or 1,

R^b is hydrogen, straight chained or branched C_{1-3} alkyl, C_{3-6} cycloalkyl or phenyl,

R^c is adamantanyl (), 6 membered heterocycloalkyl containing one or more hetero atoms selected from the group consisting of N, O and S, phenyl, or 6 membered heteroaryl containing one or more hetero atoms selected from the group consisting of N, O and S, wherein the phenyl and heteroaryl may be independently substituted with at least one selected from the group consisting of halogen, and straight chained or branched C_{1-3} alkoxy;

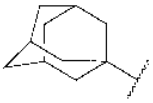
R^7, R^8, and R^9 are methyl; and

R^{10} is hydrogen or methyl.

4. The compound, the isomer thereof, the solvate thereof, the hydrate thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein:

R^6 is hydrogen, methyl, $-(CH_2)C(=O)NHR^b$, or $-C(=O)R^c$,

R^b is hydrogen, isopropyl, cyclopropyl, cyclohexyl, phenyl or benzyl,

R^c is adamantanyl (),morpholinyl, phenyl or pyridinyl, wherein the phenyl and pyridinyl may be independently substituted with at least one selected from the group consisting of F, Cl and methoxy.

5. The compound, the isomer thereof, the solvate thereof, the hydrate thereof or the pharmaceutically acceptable salt thereof according to claim 1, wherein the compound represented by formula 1 is selected from the group consisting of the following compounds:

<1> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <2> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-1-methyl-1H-indole-2-carboxamide; <3> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-7-bromo-1H-indole-2-carboxamide; <4> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-6-chloro-1H-indole-2-

carboxamide; <5> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-6-bromo-1H-indole-2-carboxamide; <6> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-fluoro-1H-indole-2-carboxamide; <7> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-bromo-1H-indole-2-carboxamide; <8> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-chloro-1H-indole-2-carboxamide; <9> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-methyl-1H-indole-2-carboxamide; <10> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide; <11> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-(trifluoromethoxy)-1H-indole-2-carboxamide; <12> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-6-methoxy-1H-indole-2-carboxamide; <13> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-methoxy-1H-indole-2-carboxamide; <14> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5,6-dimethoxy-1H-indole-2-carboxamide; <15> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)benzofuran-2-carboxamide; <16> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-chlorobenzofuran-2-carboxamide; <17> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-5-bromobenzofuran-2-

carboxamide; <18> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-7-methoxybenzofuran-2-carboxamide; <19> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-methylbenzofuran-2-carboxamide; <20> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <21> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-chlorobenzo[b]thiophene-2-carboxamide; <22> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-bromobenzo[b]thiophene-2-carboxamide; <23> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-chloro-6-methylbenzo[b]thiophene-2-carboxamide; <24> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-chloro-6-fluorobenzo[b]thiophene-2-carboxamide; <25> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3,6-dichlorobenzo[b]thiophene-2-carboxamide; <26> N-(5-(benzyloxy)-3,4,6-trimethylpyridin-2-yl)-3-chloro-6-methoxybenzo[b]thiophene-2-carboxamide; <27> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <28> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1-methyl-1H-indole-2-carboxamide; <29> 7-bromo-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <30> 6-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <31> 6-bromo-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-

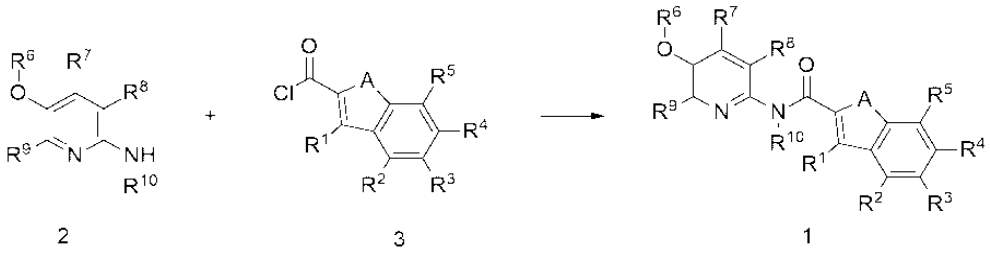
indole-2-carboxamide; <32> 5-fluoro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <33> 5-bromo-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <34> 5-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-1H-indole-2-carboxamide; <35> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-5-methyl-1H-indole-2-carboxamide; <36> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-5-(trifluoromethyl)-1H-indole-2-carboxamide; <37> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-5-(trifluoromethoxy)-1H-indole-2-carboxamide; <38> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-6-methoxy-1H-indole-2-carboxamide; <39> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-5-methoxy-1H-indole-2-carboxamide; <40> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-5,6-dimethoxy-1H-indole-2-carboxamide; <41> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzofuran-2-carboxamide; <42> 5-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzofuran-2-carboxamide; <43> 5-bromo-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzofuran-2-carboxamide; <44> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-7-methoxybenzofuran-2-carboxamide; <45> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-3-methylbenzofuran-2-carboxamide; <46> N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-

2-carboxamide; <47> 3-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <48> 3-bromo-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <49> 3-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-6-methylbenzo[b]thiophene-2-carboxamide; <50> 3-chloro-6-fluoro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <51> 3,6-dichloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <52> 3-chloro-N-(5-hydroxy-3,4,6-trimethylpyridin-2-yl)-6-methoxybenzo[b]thiophene-2-carboxamide; <53> 3-chloro-6-fluoro-N-(5-methoxy-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <54> 3-chloro-6-fluoro-N-(5-methoxy-3,4,6-trimethylpyridin-2-yl)-N-methylbenzo[b]thiophene-2-carboxamide; <55> 3-chloro-6-fluoro-N-(5-(2-(isopropylamino)-2-oxoethoxy)-3,4,6-trimethylpyridin-2-yl)benzo[b]thiophene-2-carboxamide; <56> 3-chloro-N-(5-(2-(cyclopropylamino)-2-oxoethoxy)-3,4,6-trimethylpyridin-2-yl)-6-fluorobenzo[b]thiophene-2-carboxamide; <57> 3-chloro-N-(5-(2-(cyclohexylamino)-2-oxoethoxy)-3,4,6-trimethylpyridin-2-yl)-6-fluorobenzo[b]thiophene-2-carboxamide; <58> N-(5-(2-(benzylamino)-2-oxoethoxy)-3,4,6-trimethylpyridin-2-yl)-3-chloro-6-

fluorobenzo[b]thiophene-2-carboxamide; <59> 3-chloro-6-fluoro-N-(3,4,6-trimethyl-5-(2-oxo-2-(phenylamino)ethoxy)pyridin-2-yl)benzo[b]thiophene-2-carboxamide; <60> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl benzoate; <61> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 4-fluorobenzoate; <62> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 3-methoxybenzoate; <63> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 4-methoxybenzoate; <64> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 5-fluoropicolinate; <65> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 6-fluoronicotinate; <66> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 5-chloropicolinate; <67> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl 6-chloropicolinate; <68> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl (3r,5r,7r)-adamantane-1-carboxylate; <69> 6-(3-chloro-6-fluorobenzo[b]thiophene-2-carboxamido)-2,4,5-trimethylpyridin-3-yl morpholine-4-carboxylate.

6. A method for preparing a compound represented by formula 1 comprising a step of preparing a compound represented by formula 1 by reacting a compound represented by formula 2 with a compound represented by formula 3, as shown in reaction formula 1 below:

[Reaction Formula 1]



2 3 1

(In reaction formula 1,

A, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, and R^{10} are as defined in formula 1 of claim 1).

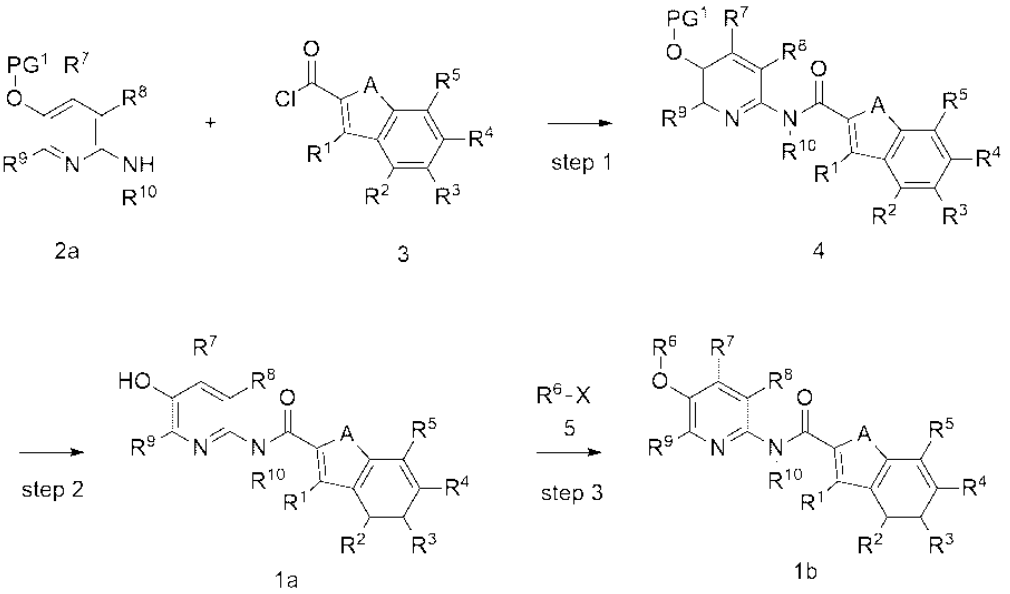
7. A method for preparing a compound represented by formula 1 comprising the following steps, as shown in reaction formula 2 below:

preparing a compound represented by formula 4 by reacting a compound represented by formula 2a with a compound represented by formula 3 (step 1);

preparing a compound represented by formula 1a by deprotecting the compound represented by formula 4 obtained in step 1 above (step 2); and

preparing a compound represented by formula 1b by reacting the compound represented by formula 1a obtained in step 2 above with a compound represented by formula 5 (step 3):

[Reaction Formula 2]



(In reaction formula 2,

A, R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, R^9, and R^{10} are as defined in formula 1 of claim 1 except when R^6 is hydrogen;

the compound represented by formula 1a is a derivative of formula 1 wherein R^6 is hydrogen;

the compound represented by formula 1b is a derivative of formula 1 except when R^6 is hydrogen;

PG^1 is an alcohol protecting group selected from the group consisting of acetyl (Ac), benzoyl (Bz),

benzyl (Bn), methylthiomethyl ether, MEM (β-methoxyethoxymethyl ether), DMT (dimethoxytrityl, [bis-(4-methoxyphenyl)phenylmethyl]), MOM (methoxymethyl ether), MMT (methoxytrityl [(4-methoxyphenyl)diphenylmethyl]), PMP (p-methoxybenzyl ether), Piv (pivaloyl), THP (tetrahydropyranyl), THF (tetrahydrofuran) and Trityl (triphenylmethyl, Tr); and

X is halogen).

8. A pharmaceutical composition comprising a compound represented by formula 1 of claim 1, an isomer thereof, a solvate thereof, a hydrate thereof or a pharmaceutically acceptable salt thereof as an active ingredient for the prevention or treatment of autoimmune disease.

9. The pharmaceutical composition according to claim 8, wherein the compound inhibits the adhesion of monocytes to intestinal epithelial cells by TNF-α or IL-6.

10. The pharmaceutical composition according to claim 8, wherein the autoimmune disease is at least one selected from the group consisting of inflammatory

bowel disease, asthma, type 1 diabetes, rheumatoid arthritis, polymyalgia rheumatica, ankylosing spondylitis, psoriatic arthritis, psoriasis, eczema, sclerosis, vitiligo, multiple sclerosis, IL-17-induced dementia, peripheral neuritis, uveitis, polymyositis/dermatomyositis, autoimmune cytopenia, autoimmune myocarditis, atopic dermatitis, primary cirrhosis, dry eye syndrome, fibromyalgia, Goodpasture’s syndrome, autoimmune meningitis, Sjogren's syndrome, systemic lupus erythematosus, Addison's disease, alopecia areata, autoimmune hepatitis, autoimmune mumps, dystrophic epidermolysis bullosa, epididymitis, glomerulonephritis, Graves' disease, celiac disease, Guillain-Barré syndrome, Hashimoto's disease, hemolytic anemia, myasthenia gravis, amyotrophic lateral sclerosis, pemphigus vulgaris, rheumatic fever, sarcoidosis, skin sclerosis, spondyloarthrosis, thyroiditis, vasculitis, vitiligo, myxedema, pernicious anemia, antiphospholipid syndrome, late and chronic rejection of solid organ transplantation, and graft-versus-host disease.

11. The pharmaceutical composition according to claim 10, wherein the inflammatory bowel disease is at

least one selected from the group consisting of enteritis, colitis, ulcerative enteritis, Crohn's disease, Crohn's cytoma, irritable bowel syndrome, hemorrhagic rectal ulcer, pouchitis, peptic ulcer, intestinal Behcet's disease and gastritis.

12. A compound represented by formula 1 of claim 1 for use in preventing or treating autoimmune disease comprising administering a compound represented by formula 1 of claim 1, an isomer thereof, a solvate thereof, a hydrate thereof or a pharmaceutically acceptable salt thereof to a subject in need thereof.

13. The compound represented by formula 1 of claim 1 for use in preventing or treating autoimmune disease according to claim 12, wherein the compound inhibits the adhesion of monocytes to intestinal epithelial cells by TNF-α or IL-6.

14. The compound represented by formula 1 of claim 1 for use in preventing or treating autoimmune disease according to claim 12, wherein the autoimmune disease is at least one selected from the group consisting of inflammatory bowel disease, asthma, type 1 diabetes, rheumatoid arthritis, polymyalgia

rheumatica, ankylosing spondylitis, psoriatic arthritis, psoriasis, eczema, sclerosis, vitiligo, multiple sclerosis, IL-17-induced dementia, peripheral neuritis, uveitis, polymyositis/dermatomyositis, autoimmune cytopenia, autoimmune myocarditis, atopic dermatitis, primary cirrhosis, dry eye syndrome, fibromyalgia, Goodpasture’s syndrome, autoimmune meningitis, Sjogren's syndrome, systemic lupus erythematosus, Addison's disease, alopecia areata, autoimmune hepatitis, autoimmune mumps, dystrophic epidermolysis bullosa, epididymitis, glomerulonephritis, Graves' disease, celiac disease, Guillain-Barré syndrome, Hashimoto's disease, hemolytic anemia, myasthenia gravis, amyotrophic lateral sclerosis, pemphigus vulgaris, rheumatic fever, sarcoidosis, skin sclerosis, spondyloarthrosis, thyroiditis, vasculitis, vitiligo, myxedema, pernicious anemia, antiphospholipid syndrome, late and chronic rejection of solid organ transplantation, and graft-versus-host disease.

15. The compound represented by formula 1 of claim 1 for use in preventing or treating autoimmune disease according to claim 14, wherein the inflammatory bowel disease is at least one selected from the group consisting of enteritis, colitis,

ulcerative enteritis, Crohn's disease, Crohn's cytoma, irritable bowel syndrome, hemorrhagic rectal ulcer, pouchitis, peptic ulcer, intestinal Behcet's disease and gastritis.

16. A pharmaceutical composition comprising a compound represented by formula 1 of claim 1, an isomer thereof, a solvate thereof, a hydrate thereof or a pharmaceutically acceptable salt thereof; and a pharmaceutically acceptable excipient.

17. A use of compound represented by formula 1 of claim 1, an isomer thereof, a solvate thereof, a hydrate thereof or a pharmaceutically acceptable salt thereof for the manufacture of a medicine for preventing or treating autoimmune disease.

18. The use of compound according to claim 17, wherein the compound inhibits the adhesion of monocytes to intestinal epithelial cells by TNF-α or IL-6.

19. The use of compound according to claim 17, wherein the autoimmune disease is at least one selected from the group consisting of inflammatory bowel disease, asthma, type 1 diabetes, rheumatoid arthritis, polymyalgia rheumatica, ankylosing

spondylitis, psoriatic arthritis, psoriasis, eczema, sclerosis, vitiligo, multiple sclerosis, IL-17-induced dementia, peripheral neuritis, uveitis, polymyositis/dermatomyositis, autoimmune cytopenia, autoimmune myocarditis, atopic dermatitis, primary cirrhosis, dry eye syndrome, fibromyalgia, Goodpasture’s syndrome, autoimmune meningitis, Sjogren's syndrome, systemic lupus erythematosus, Addison's disease, alopecia areata, autoimmune hepatitis, autoimmune mumps, dystrophic epidermolysis bullosa, epididymitis, glomerulonephritis, Graves' disease, celiac disease, Guillain-Barré syndrome, Hashimoto's disease, hemolytic anemia, myasthenia gravis, amyotrophic lateral sclerosis, pemphigus vulgaris, rheumatic fever, sarcoidosis, skin sclerosis, spondyloarthrosis, thyroiditis, vasculitis, vitiligo, myxedema, pernicious anemia, antiphospholipid syndrome, late and chronic rejection of solid organ transplantation, and graft-versus-host disease.

20. The use of compound according to claim 19, wherein the inflammatory bowel disease is at least one selected from the group consisting of enteritis, colitis, ulcerative enteritis, Crohn's disease,

Crohn's cytoma, irritable bowel syndrome, hemorrhagic rectal ulcer, pouchitis, peptic ulcer, intestinal Behcet's disease and gastritis.