[CLAIMS]

[Claim 1]

A use of the pharmaceutical composition in preparation of a medicament for treating obesity or a non-alcoholic fatty liver disease, the composition comprising, as an active ingredient, a long-acting conjugate of a triple agonist represented by Formula 1 below and having activities to all of a glucagon receptor, a glucagon-like peptide-1 (GLP-1) receptor, and a glucose-dependent insulinotropic polypeptide (GIP) receptor,

wherein the long-acting conjugate of the triple agonist is to be parenterally administered to a patient with obesity or the non-alcoholic fatty liver disease once a week at a dose of 0.5 mg to 8 mg:

[Formula 1]

X–L–F

wherein X is a peptide including an amino acid sequence of SEQ ID NOS: 21, 22, 31, 32, 37, 42, 43, 50, 53, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 79, 96, 97, 98, 99, 100, 101, and 102;

L is a linker including an ethylene glycol repeating unit;

F is an immunoglobulin Fc region; and

– is a covalent bond between X and L and between L and F.

[Claim 2]

The use of claim 1, wherein the long-acting conjugate of the triple agonist is to be parenterally administered to a patient with obesity or a non-alcoholic fatty liver disease once a week at a dose of 2 mg to 6 mg.

[Claim 3]

The use of claim 1, wherein the parenteral administration is subcutaneous administration.

[Claim 4]

The use of claim 1, wherein the patient with obesity has a body mass index (BMI) of 23 kg/m^2 or more.

[Claim 5]

The use of claim 1, wherein the patient with a non-alcoholic fatty liver disease has a liver fat content of 8% or more measured by magnetic resonance imaging–derived proton density fat fraction (MRI-PDFF).

[Claim 6]

The use of claim 1, wherein an individual administered with the pharmaceutical composition exhibits at least one of properties (a) to (f) below:

(a) weight loss;

(b) blood pressure decrease;

(c) visceral fat mass reduction in the liver;

(d) NAS decrease;

(e) reduction in ballooning degeneration of hepatocytes or the number of lobular inflammation; and

(f) fibrosis score decrease.

[Claim 7]

The use of claim 1, wherein the pharmaceutical composition is to be administered to an arm, thigh, or abdomen.

[Claim 8]

The use of claim 1, wherein the F is an IgG Fc region.

[Claim 9]

The use of claim 1, wherein the long-acting conjugate has a structure in which the Fc region is in a dimer form formed of two polypeptide chains and the peptide X is linked to only one of the two polypeptide chains of the Fc dimer in the long-acting conjugate.

[Claim 10]

The use of claim 9, wherein the polypeptide chain of the Fc dimer includes an amino acid sequence of SEQ ID NO: 123.

[Claim 11]

The use of claim 1, wherein the X includes an amino acid sequence selected from the group consisting of SEQ ID NOS: 42, 43, and 50.

[Claim 12]

The use of claim 1, wherein the L is polyethylene glycol having a molecular weight of 1 kDa to 20 kDa.

[Claim 13]

The use of claim 1, wherein the non-alcoholic fatty liver disease is selected from the group consisting of non-alcoholic fatty liver (NAFL), non-alcoholic steatohepatitis (NASH), liver fibrosis, cirrhosis, and any combination thereof.