CLAIMS

[Claim 1]. A mesenchymal stem cell (MSC) for anticancer comprising an oncolytic adenovirus, wherein the oncolytic adenovirus comprises a target gene, a sequence of SEQ ID NO: 1 and the E1A gene; and the E1B 19kDa gene is deleted in the oncolytic adenovirus; and wherein the mesenchymal stem cell is infected for 50 hours or less with the oncolytic adenovirus, and can be administered intravenously.

[Claim 2]. The mesenchymal stem cell for anticancer of claim 1, wherein the oncolytic adenovirus further comprises a gene expression regulatory sequence comprising, in a 5' to 3' direction, (a) a domain sequence of 1 to 10 copies of a hypoxia-response element (HRE), (b) a sequence of 1 to 10 copies of alpha-fetoprotein (AFP) enhancer A, (c) a sequence of one copy of AFP promoter enhancer B, and (d) a TERT promoter, a PSA promoter, a PSMA promoter, a CEA promoter, an E2F promoter or an AFP promoter sequence; and a target gene that is operatively linked to the gene expression regulatory sequence.

[Claim 3]. The mesenchymal stem cell for anticancer of claim 2, wherein the oncolytic adenovirus comprises the gene expression regulatory sequence of an AFP promoter sequence of SEQ ID NO: 5 or a TERT promoter sequence of SEQ ID NO: 8.

[Claim 4]. The mesenchymal stem cell for anticancer of claim 2, wherein the oncolytic adenovirus comprises the domain sequence of 6 copies of an HRE and the sequence of 2 copies of alpha-fetoprotein (AFP) enhancer A.

[Claim 5]. A composition for gene delivery for intravenous administration comprising a mesenchymal stem cell, wherein the mesenchymal stem cell comprises an oncolytic adenovirus comprising a target gene, a sequence of SEQ ID NO: 1 and the E1A gene, and the E1B 19kDa gene is deleted in the oncolytic adenovirus, and is infected for 50 hours or less with an oncolytic adenovirus.

[Claim 6]. The composition for gene delivery of claim 5, wherein the oncolytic adenovirus further comprises a gene expression regulatory sequence for regulating the expression of the target gene of an AFP promoter sequence of SEQ ID NO: 5 or a TERT promoter sequence of SEQ ID NO: 8.

[Claim 7]. The composition for gene delivery of claim 5, wherein the oncolytic adenovirus further comprises a gene expression regulatory sequence comprising, in a 5' to 3' direction, (a) a domain sequence of 1 to 10 copies of a hypoxia-response element (HRE), (b) a sequence of 1 to 10 copies of alpha-fetoprotein (AFP) enhancer A, (c) a sequence of one copy of AFP promoter enhancer B, and (d) a TERT promoter, a PSA promoter, a PSMA promoter, a CEA promoter, an E2F promoter or an AFP promoter sequence; and a target gene that is operatively linked to the gene expression regulatory sequence.

[Claim 8]. The composition for gene delivery of claim 7, wherein the oncolytic adenovirus comprises the domain sequence of 6 copies of an HRE and the sequence of 2 copies of alpha-fetoprotein (AFP) enhancer A.

[Claim 9]. A pharmaceutical composition for cancer treatment for intravenous administration comprising a mesenchymal stem cell, wherein the mesenchymal stem cell comprises an oncolytic adenovirus comprising a target gene, a sequence of SEQ ID NO: 1 and the E1A gene, and the E1B 19kDa gene is deleted in the oncolytic adenovirus, and is infected for 50 hours or less with an oncolytic adenovirus.

[Claim 10]. The pharmaceutical composition for cancer treatment of claim 9, wherein the oncolytic adenovirus further comprises a gene expression regulatory sequence for regulating the expression of a target gene of an AFP promoter sequence of SEQ ID NO: 5 or a TERT promoter sequence of SEQ ID NO: 8.

[Claim 11]. The pharmaceutical composition for cancer treatment of claim 5, wherein the oncolytic adenovirus further comprises a gene expression regulatory sequence comprising, in a 5' to 3' direction, (a) a domain sequence of 1 to 10 copies

of a hypoxia-response element (HRE), (b) a sequence of 1 to 10 copies of alpha-fetoprotein (AFP) enhancer A, (c) a sequence of one copy of AFP promoter enhancer B, and (d) a TERT promoter, a PSA promoter, a PSMA promoter, a CEA promoter, an E2F promoter or an AFP promoter sequence; and a target gene that is operatively linked to the gene expression regulatory sequence.

[Claim 12]. The pharmaceutical composition for cancer treatment of claim 11, wherein the oncolytic adenovirus comprises the domain sequence of 6 copies of an HRE and the sequence of 2 copies of alpha-fetoprotein (AFP) enhancer A.

[Claim 13]. A recombinant adenovirus comprises: a gene expression regulatory sequence comprising, in a 5' to 3' direction, (a) a sequence of 6 copies of a hypoxia-response element (HRE), (b) a sequence of 2 copies of alpha-fetoprotein (AFP) enhancer A, (c) a sequence of one copy of AFP promoter enhancer B, and (d) an AFP promoter sequence or a TERT promoter sequence; a target gene that is operatively linked to the gene expression regulatory sequence; and a serotype 35 fiber knob sequence.