constituent materials, the pharmacological effect of the drug to be delivered can be greatly enhanced while the drug side effect-suppressing effect of the polymer micelle technology is exhibited; thus, the inventors have completed the present invention.

[0007] That is, according to the present invention,

a polymer micelle pharmaceutical composition is provided and includes:

a block copolymer unit α having a hydrophilic polymer chain segment and a hydrophobic polymer chain segment;

a block copolymer unit β having a hydrophilic polymer chain segment and a hydrophobic polymer chain segment, and

a block copolymer unit γ having a hydrophilic polymer chain segment, which has a target binding site bound thereto, and a hydrophobic polymer chain segment, wherein:

the block copolymer unit β has a drug bound thereto;

the block copolymer unit α is free of a target binding site and a drug;

the block copolymer unit α, the block copolymer unit β, and the block copolymer unit γ are radially arranged in the state in which the hydrophilic polymer chain segments are directed outward and the hydrophobic polymer chain segments are directed inward;

the hydrophobic polymer chain segment of the block copolymer unit α is constituted of repeating units having side chains, at least one of the side chains having a hydrophilic group; and

the content of the block copolymer unit α is 15 wt% or more.

Effects of the Invention

[0008] According to the present invention, a polymer micelle pharmaceutical composition is provided, in which both of the enhancement of the pharmacological effect of the drug and the

Claims

[Claim 1] A polymer micelle pharmaceutical composition, comprising:

a block copolymer unit α having a hydrophilic polymer chain segment and a hydrophobic polymer chain segment;

a block copolymer unit β having a hydrophilic polymer chain segment and a hydrophobic polymer chain segment; and

a block copolymer unit γ having a hydrophilic polymer chain segment, which has a target binding site bound thereto, and a hydrophobic polymer chain segment,

wherein:

the block copolymer unit β has a drug bound thereto;

the block copolymer unit α is free of a target binding site and a drug;

the block copolymer unit α, the block copolymer unit β, and the block copolymer unit γ are radially arranged in the state in which the hydrophilic polymer chain segments are directed outward and the hydrophobic polymer chain segments are directed inward;

the hydrophobic polymer chain segment of the block copolymer unit α is constituted of repeating units having side chains, at least one of the side chains having a hydrophilic group; and

the content of the block copolymer unit α is 15 wt% or more.

[Claim 2] The polymer micelle pharmaceutical composition according

to claim 1, wherein 20% to 80% of the side chains of the hydrophobic polymer chain segment of the block copolymer unit α have a hydrophilic group.

[Claim 3] The polymer micelle pharmaceutical composition according to claim 1 or 2, wherein the content of the block copolymer unit α is 80 wt% or less.

[Claim 4] The polymer micelle pharmaceutical composition according to any one of claims 1 to 3, wherein the hydrophilic polymer chain segment of each of the block copolymer units α and β comprises a polyethylene glycol chain, and the hydrophobic polymer chain segment of each of the block copolymer units α and β comprises a polyamino acid chain.

[Claim 5] The polymer micelle pharmaceutical composition according to any one of claims 1 to 4, wherein the block copolymer unit α has a lower hydrophobicity than the block copolymer unit β owing to the hydrophilic group(s) of the side chains of the hydrophobic polymer chain segment.

[Claim 6] The polymer micelle pharmaceutical composition according to any one of claims 1 to 5, wherein:

the hydrophobic polymer chain segment of the block copolymer unit β is constituted of repeating units having side chains; and

the number of hydrophilic groups of the side chains of the hydrophobic polymer chain segment of the block copolymer unit α is larger than the number of hydrophilic groups of the side chains of the hydrophobic polymer chain segment of the block copolymer unit β.

[Claim 7] The polymer micelle pharmaceutical composition according to any one of claims 1 to 6, wherein the block copolymer unit β has a higher hydrophobicity than the block copolymer unit α owing to the drug.

[Claim 8] The polymer micelle pharmaceutical composition according to any one of claims 1 to 7, wherein the block copolymer unit β, even while having more hydrophilic groups than the block copolymer unit α, has a higher hydrophobicity than the block copolymer unit α owing to the drug.