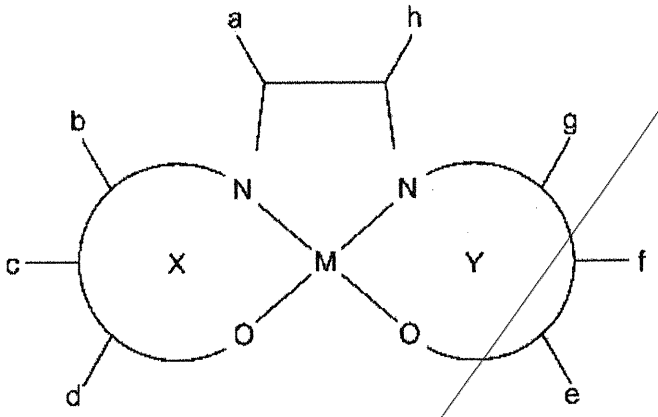
[Document Name] Claims

[Claim 1]

A new self-magnetic metal-salen complex compound represented by the following formula (I),

(I)



wherein each of X and Y is a five-membered ring structure including a coordinate bond between N and M, or its six-membered ring structure,

wherein M is a bivalent metallic element composed of Fe, Cr, Mn, Co, Ni, Mo, Ru, Rh, Pd, W, Re, Os, Ir, Pt, Nd, Sm, Eu or Gd, and

wherein when both X and Y are the five-membered ring structure, b and g do not exist and the formula (I) is any one of (i) to (iv):

(i) each of a to h is hydrogen or any one of (A) to (G) mentioned below and -C(=O)m (where m is hydrogen or any one of (A) to (G) mentioned below);

(ii) each of (c, d) and (f, e) forms part of a heterocyclic structure and constitutes a condensate of the compound represented by the formula (I) and the heterocyclic structure,

each of a, b, g, and h is hydrogen or any one of (A) to (G) mentioned below and -C(=O)m (where m is hydrogen or any one of (A) to (G) mentioned below),

the heterocyclic structure is any one of three-membered to seven-membered ring structures containing furan, theophene, pyrrole, pyrrolidine, pyrazole, pyrazolone, imidazole, 2-isoimidazole, oxazole, isoxazole, thiazole, imidazole,

imidazolidine, oxazoline, oxazolidine, 1,2-pyran, thiazine, pyridine, pyridazine, pyrimidine, pyrazine, orthoxadine, oxazine, piperidine, piperazine, triazine, dioxane, or morpholine, and

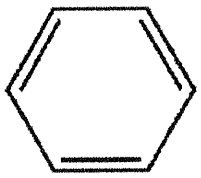
a side chain for the heterocyclic structure is halogen, -R, -O-R (where R is one functional group selected from a hydrocarbon group including a methyl group), or hydrogen;

(iii) each of (c, d) and (f, e) forms part of one of condensed ring structures containing benzene or naphthalene and anthracene and forms a condensate of the compound represented by the formula (I) and the condensed ring structure,

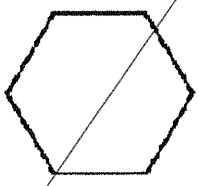
each of a, b, g, and h is hydrogen or any one of (A) to (G) mentioned below, and

a side chain for the condensed ring structure is halogen, R-O-: (where R is one functional group selected from a hydrocarbon group including a methyl group), or hydrogen;

(iv) each of a and h forms part of a cyclic hydrocarbon structure containing a compound mentioned below and forms a condensate of the compound represented by the formula (I) and the cyclic hydrocarbon structure



or

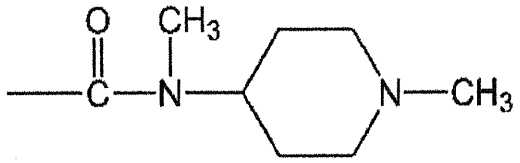


each of b to g and a side chain for the cyclic hydrocarbon structure is hydrogen or any one of (A) to (G) mentioned below:

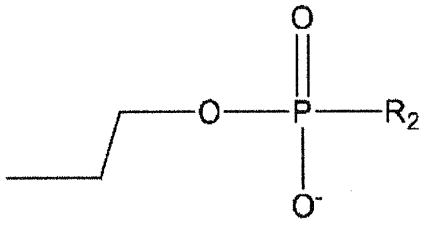
(A) $-CO_2R$,$-C(=O)R$ (where R represents hydrogen or chain or cyclic hydrocarbon having a saturated structure with carbon number 1 to 6 or an unsaturated structure (alkane or alkyne))

(B) $-CO(OCH_2CH_2)_2OCH_3$

(C)



(D)



(where R_2 represents one of nucleic acids which are formed of adenine, guanine, thymine, cytosine, or uracil, or a plurality of the nucleic acids which are combined together);

(E) $-NHCOH$ or $-NR_1R_2$ (where R_1 and R_2 represent hydrogen or chain or cyclic hydrocarbon with the same or different saturated structure with carbon number 1 to 6 or unsaturated structure (alkane or alkyne));

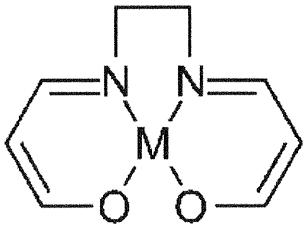
(F) $-NHR_3-$, $-NHCOR_3$, $-CO_2-R_3$, $-S-S-R_3$ or $-R_3$ (where R_3 represents hydrogen or a substituted compound as a result of elimination of a leaving group such as a hydroxyl group; and the substituted compound is functional molecules including at least one of enzymes, antibodies, antigens, peptides, amino acids, oligonucleotides, proteins, nucleic acids, and medical molecules); and

(G) halogen atoms such as chlorine, bromine, or fluorine.

[Claim 2]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (II).

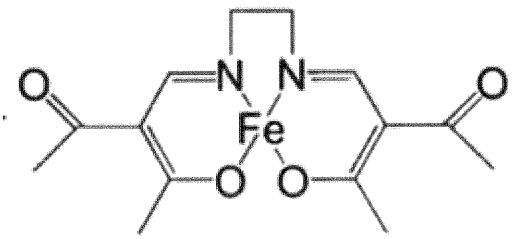
(II)



[Claim 3]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (III).

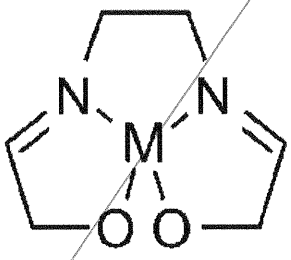
(III)



[Claim 4]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (IV).

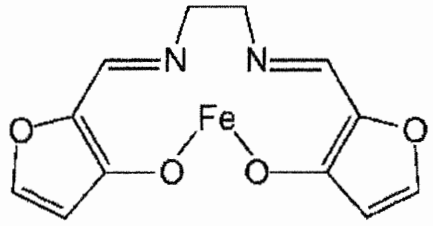
(IV)



[Claim 5]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (V).

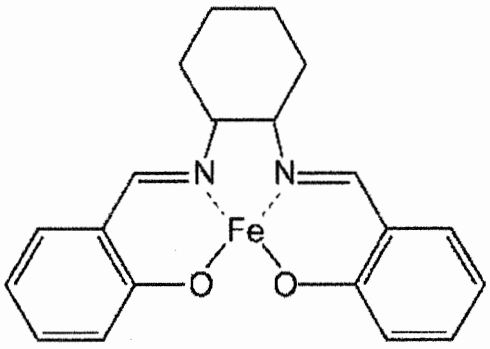
(V)



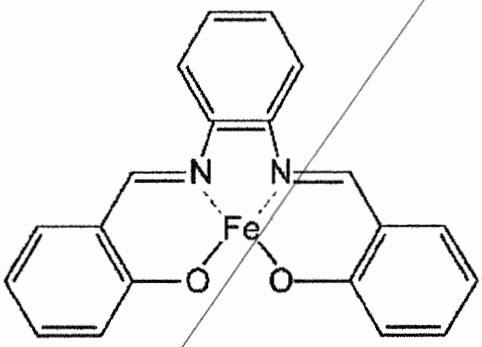
[Claim 6]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (VI) or (VII).

(VI)



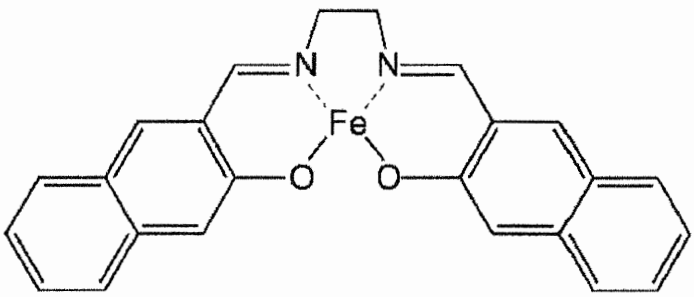
(VII)



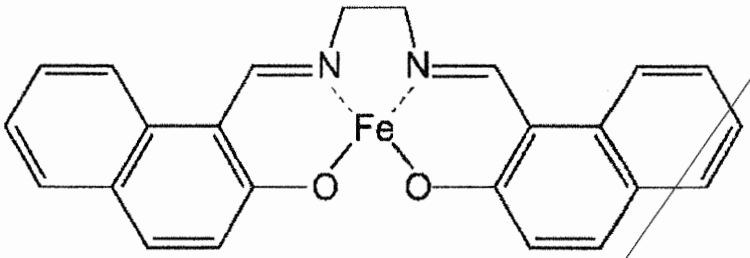
[Claim 7]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (VIII) or (IX).

(VIII)



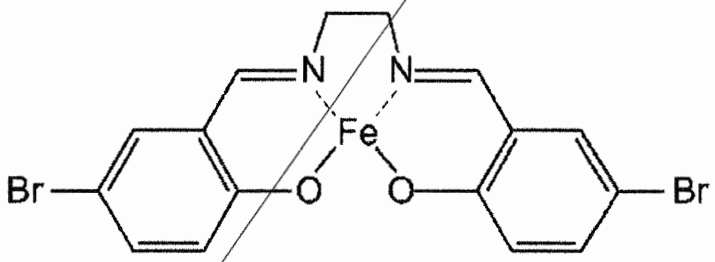
(IX)



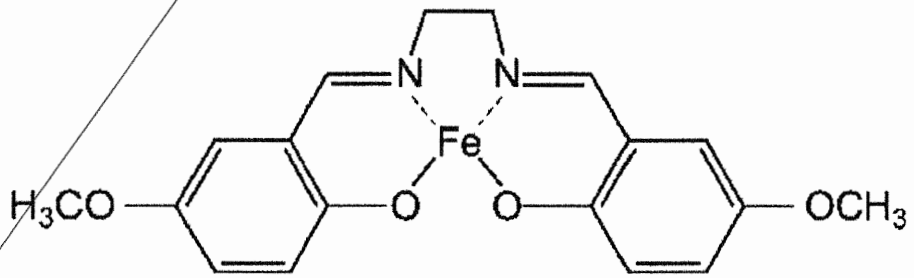
[Claim 8]

The metal-salen complex compound according to claim 1, wherein the formula (I) is the following compound (X) or (XI).

(X)



(XI)



[Claim 9]

The metal-salen complex compound according to any one of claims 1 to 8, wherein charge transfer of a side chain of the metal-salen complex compound of the formula (I) is less than 0. 5 electrons (e).

[Claim 10]

A magnetic drug containing the metal-salen complex compound stated in any one of claims 1 to 9, the magnetic drug being guided to a target tissue by administering the magnetic drug into a body and then irradiating the magnetic drug with an external magnetic field.

[Claim 11]

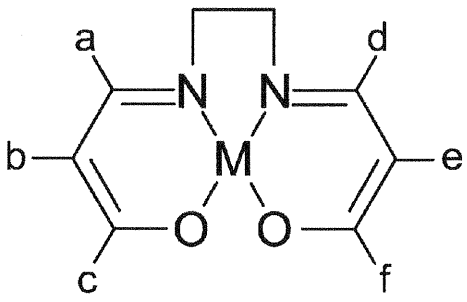
An antitumor drug containing the magnetic drug stated in claim 10 as an active ingredient.

[Claim 12]

A magnetic drug guiding system comprising a means for supplying a magnetic field to the drug stated in claim 10 or 11 and introduced into a body and a means for moving the magnetic field to an affected site.

[Document Name] Claims

[Claim 1] A new self-magnetic metal-salen complex compound represented by formula (II),



(II),

wherein M is Fe, and

each of a-f is a methyl group or a hydrogen, or

each of b, e is a hydrogen and a, c, d and f is a methyl group.

[Claim 2] The metal-salen complex compound according Claim 1, wherein each of a-f is methyl group.

[Claim 3] The metal-salen complex compound according Claim 1, wherein each of b, e is a hydrogen and each a, c, d and f is a methyl group.

[Claim 4] The metal-salen complex compound according to any one of claims 1 to 3, wherein charge transfer of a side chain of the metal-salen complex compound of the formula (I) is less than 0. 5 electrons (e).

[Claim 5] A magnetic drug containing the metal-salen complex compound stated in any one of claims 1 to 4, the magnetic drug being guided to a target tissue by administering the magnetic drug into a body and then irradiating the magnetic drug with an external magnetic field.

[Claim 6] An antitumor drug containing the magnetic drug stated in claim 5 as an active ingredient.

[Claim 7] A magnetic drug guiding system comprising a means for supplying a magnetic field to the drug stated in claim 5 or 6 and introduced into a body and a means for moving the magnetic field to an affected site.

[Claim 8] Magnetic compound comprising a metal complex, the compound being useful for utilization of magnetism of the compound without using magnetic support made from magnetic bodies, wherein structure of the metal complex comprises structure of N,N'-ethylenebis(acetylacetoneiminate) metal, wherein the metal is Fe.