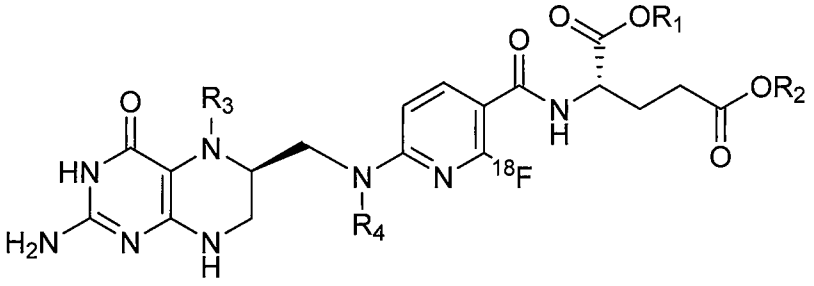
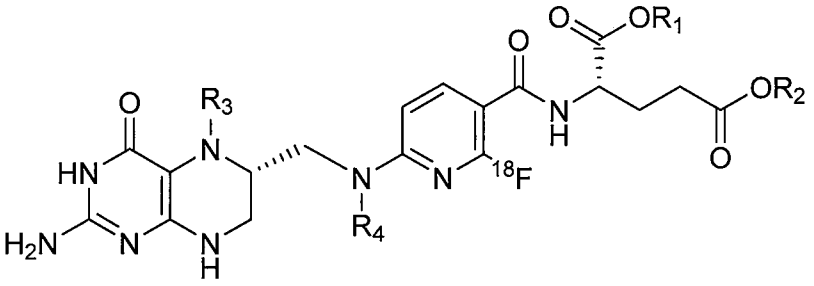
Claims

1. A compound of formula Ia or Ib or a pharmaceutically acceptable salt thereof for use in diagnostic imaging of a cell or population of cells expressing a folate-receptor *in vitro* or *in vivo* or for use in monitoring of cancer or inflammatory and autoimmune diseases



Ia



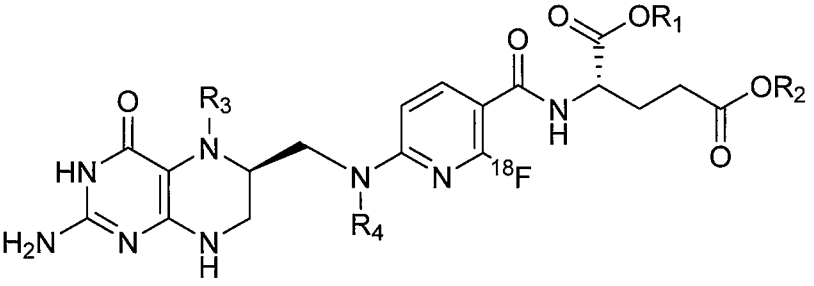
Ib

wherein

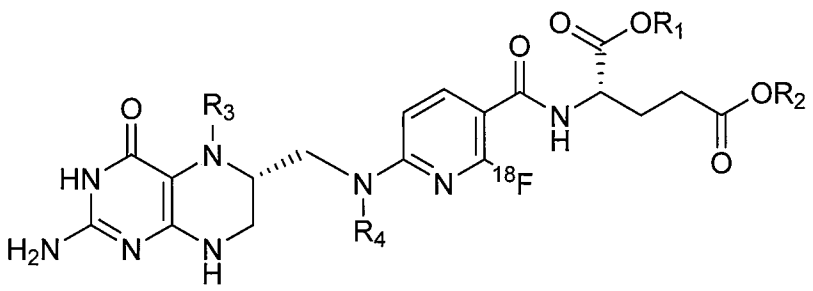
R_1, R_2 are independently of each other H or straight chain or branched C1-C6 alkyl, and

R_3, R_4 are independently of each other H, formyl, or methyl.

2. Use of a compound of formula Ia or Ib or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for the diagnostic imaging of a cell or population of cells expressing a folate-receptor *in vitro* or *in vivo,* or for the monitoring of a cancer or an inflammatory and autoimmune disease, and the treatment of the same.



Ia



Ib

wherein

R_1, R_2 are independently of each other H or straight chain or branched C1-C6 alkyl, and

R_3, R_4 are independently of each other H, formyl, or methyl.

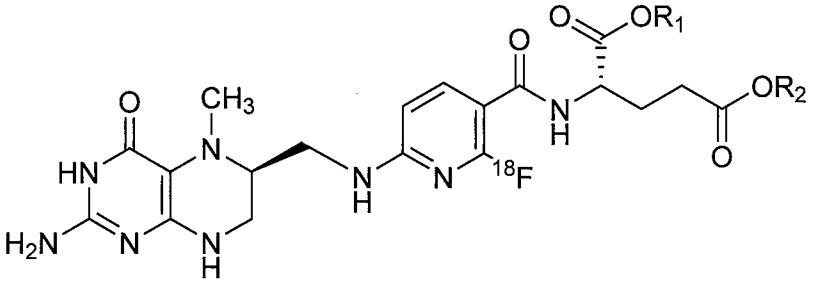
3. The compound or pharmaceutically acceptable salt thereof according to claim 1 or the use according to claim 2, wherein

R_1, R_2 are independently of each other H or straight chain or branched C1-C6 alkyl,

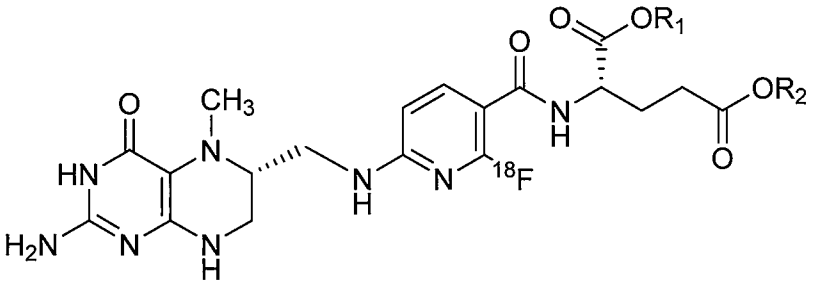
R_3 is methyl, and

R_4 is H.

4. The compound or pharmaceutically acceptable salt thereof according to claim 1 or 3, or the use according to claim 2 or 3, having formulas IIa or IIb



IIa

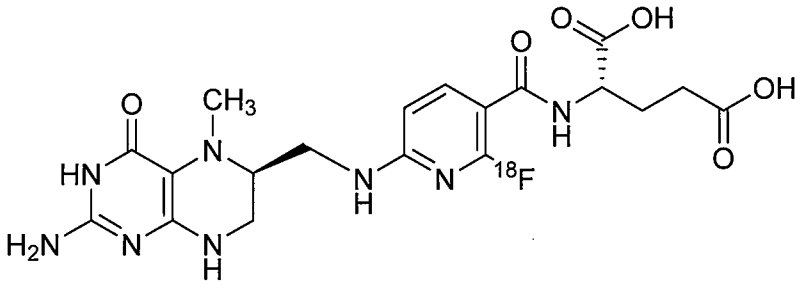


IIb

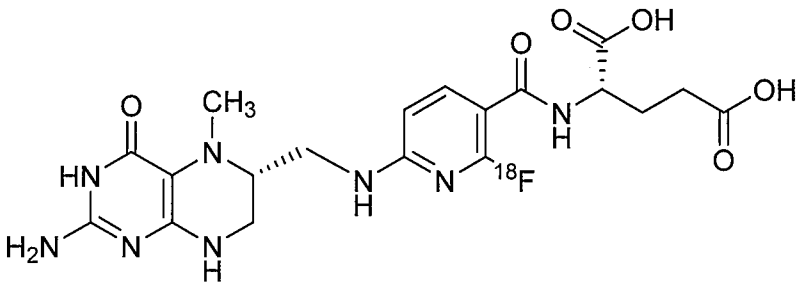
wherein

R_1, R_2 are independently of each other H, or C1-C12 alkyl.

5. The compound or pharmaceutically acceptable salt thereof according to any one of claims 1, 3 or claim 4, or the use according to any one of claims 2-4, having formulas IIIa or IIIb.



IIIa



IIIb

6. The compound or pharmaceutically acceptable salt thereof according to any one of claims 1, 3-5, or the use according to of any one of claims 2-5, having a stereoisomeric purity of greater than 99%; preferably having a stereoisomeric purity of greater than 99.5%.

7. The compound or pharmaceutically acceptable salt thereof according to any one of claims 1, 3-6, or the use according to of any one of claims 2-6, wherein the pharmaceutically acceptable salts is an alkali or alkaline earth metal salts, preferably a sodium, a potassium, a magnesium or a calcium salt.

8.A method for diagnostic imaging of a cell or population of cells expressing a folate-receptor, said method comprising the steps of administering at least one compound or pharmaceutically acceptable salt thereof according to claim 1, or any one of claims 3 to 7, in a diagnostic imaging amount, and obtaining a diagnostic image of said cell or population of cells.

9. The method according to claim 8, wherein the diagnostic imaging is performed of a cell or population of cells expressing a folate-receptor *in vitro* or *in vivo*.

10. The method according to claim 8 or claim 9, wherein the diagnostic imaging is performed of human ovarian carcinoma cells.

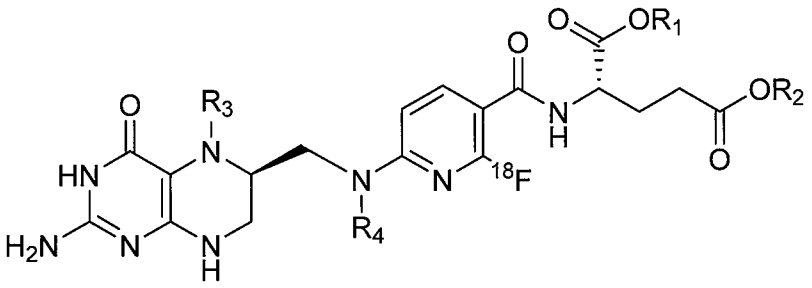
11. A method for *in vitro* detection of a cell expressing the folate receptor in a tissue sample which includes contacting said tissue sample with a compound or pharmaceutically acceptable salt thereof according to claim 1 or any one of claims 3 to 7, in effective amounts and for sufficient time and conditions to allow binding to occur and detecting such binding by techniques such as autoradiography and the like.

12. A method of diagnostic imaging or monitoring a subject comprising the steps of (i) administering at least one compound or pharmaceutically acceptable salt thereof according to claim 1 or any one of claims 3 to 7, in a diagnostic imaging amount, and (ii) performing diagnostic imaging using PET by detecting a signal from said at least one compound or pharmaceutically acceptable salt thereof.

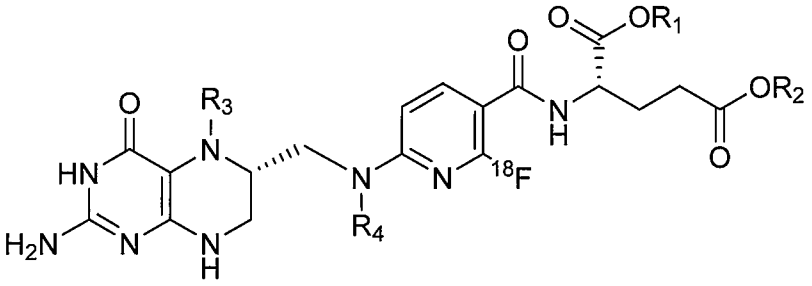
13. The use according to claims or any one of claims 2 to 7, when the use concerns the monitoring of cancer or inflammatory and autoimmune diseases in a subject and the treatment of the same, wherein at least one compound or pharmaceutically acceptable salt thereof is to be administered in a diagnostic imaging amount in combination with a therapeutically active amount, and subsequently, diagnostic imaging using PET by detecting a signal from said at least one compound or pharmaceutically acceptable salt thereof is to be performed to follow the course of cancer or inflammatory and autoimmune disease therapy.

14. The use of any one of claims 2 to 7 in combination with any other methods of diagnosis or therapy of cancer or inflammatory and autoimmune disease.

15. A compound or pharmaceutically acceptable salt thereof of formula Ia or Ib



Ia



Ib

wherein

R_1, R_2 are independently of each other H or straight chain or branched C1-C6 alkyl, and

R_3, R_4 are independently of each other H, formyl, or methyl,

or a pharmaceutically acceptable salt thereof;

for use in diagnostic imaging of a cell or population of cells expressing a folate-receptor *in vitro* or *in vivo* or for use in monitoring of cancer or inflammatory and autoimmune diseases or for the treatment of cancer and therapy thereof.