

immune deficiency (SCID) mouse). Such models maintain the genetic characteristics of the patient as well as tumor heterogeneity. Presently, the major difficulty of using PDX model for individualized precision medical treatment is the lengthy time period spent on modelling and sensitivity test, and the low success rate for modelling. For example, primary cell transplantation takes 2~3 months, and the drug sensitivity test takes 3~4 months. In addition, PDX modelling requires a high level of technical skills. Surgeons, histologists and researchers need to cooperate closely after the tumor sample is obtained from the patient. Therefore, how to improve the method for determining the sensitivity of tumor cells to an anti-tumor drug by using a PDX model becomes an urgent issue.

Summary

To overcome the above mentioned technical problems, the present inventor has developed a method for screening anti-tumor drugs by determining the sensitivity of a tumor cell to one or more candidate drugs in a time-efficient and accurate manner.

Disclosed is a method for determining the sensitivity of a primary tumor cell to an anti-tumor drug, including the following steps:

- (1) transferring a primary tumor cell into an implant device;
- (2) implanting the implant device comprising the primary tumor cell into an animal;
- (3) administering a candidate drug to the animal;
- (4) determining the sensitivity of the tumor cell to the candidate drug.

In one aspect, there is provided a method for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more candidate drugs, comprising the following steps:

- (1) transferring a primary tumor cell into an implant device;
- (2) implanting the implant device comprising the primary tumor cell into an animal;
- (3) administering the candidate drugs to the animal;
- (4) determining the sensitivity of the tumor cell to the candidate drugs.

In embodiments, the primary tumor cell is obtained from an ex vivo tumor tissue sample. The ex vivo tumor sample can be obtained from a patient, or a PDX model established by using a tumor cell of the patient.

In embodiments, the animal is a mouse, preferably a nude mouse.

In embodiments, the sensitivity of the tumor cell to the candidate drug is determined in vitro.

In embodiments, the candidate drug is administered to an animal orally or

parenterally.

In embodiments, the primary tumor cell is an isolated tumor cell that has been digested and sorted.

5 In embodiments, the sensitivity of the tumor cell to the candidate drug is determined 5-14 days after administering the candidate drug to the animal, preferably 5-7 days after administering the candidate drug to the animal.

10 In embodiments, the implant device is a tubular device having a molecular weight cut-off value of about 500,000 Dalton, preferably a modified polyvinylidene fluoride (PVDF) tube having a molecular weight cut-off value of about 500,000 Dalton, more preferably a modified PVDF tube with an inner diameter of about 1-2mm having a molecular weight cut-off value of about 500,000 Dalton. In embodiments, the tubular device having a molecular weight cut-off value of about 500,000 Dalton is a sealed device.

15 Disclosed is a kit for determining the sensitivity of a primary tumor cell to an anti-tumor drug, comprising an implant device, said implant device is a tubular device with a molecular weight cut-off value of about 500,000 Dalton, preferably a modified polyvinylidene fluoride (PVDF) tube having a molecular weight cut-off value of about 500,000 Dalton, more preferably a modified PVDF tube with an inner diameter of about 1-2mm having a molecular weight cut-off value of about 500,000 Dalton.

20 In another aspect, there is provided a kit for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more candidate drugs, comprising an implant device, said implant device is a tubular device having a molecular weight cut-off value of about 500,000 Dalton, preferably a modified polyvinylidene fluoride (PVDF) tube having a molecular weight cut-off value of about 500,000 Dalton, more preferably a modified PVDF tube with an inner diameter of about 1-2mm having a molecular weight cut-off value of about 500,000 Dalton.

25 Disclosed is the use of the kit of the present invention for determining the sensitivity of a primary tumor cell to an anti-tumor drug and for screening anti-tumor drugs in a time-efficient manner.

30 In another aspect, there is provided use of the kit as described herein for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more anti-tumor drugs.

35 **Figures**

Figure 1 is a schematic diagram of the method of the present invention.

Figure 2 is a growth curve of primary gastric cancer cells obtained from a patient after administration of anti-tumor drug Tegafur in a traditional mouse PDX model GAPF155.

40 Figure 3 shows the pharmacodynamic data according to the method of the present invention of anti-tumor drug Tegafur (S-1) for gastric cancer cells from an *ex*

vivo tumor tissue obtained from mouse PDX model GAPF155.

Figure 4 is a growth curve of primary gastric cancer cells obtained from patients after administration of anti-tumor drug Tegafur in mouse PDX model GAPF157.

Figure 5 shows the pharmacodynamic data according to the method of the present invention of anti-tumor drug Tegafur (S-1) for gastric cancer cells from an *ex vivo* tumor tissue obtained from mouse PDX model GAPF157.

Figure 6 is a growth curve of primary gastric cancer cells obtained from patients after administration of anti-tumor drug Tegafur in mouse PDX model GAPF161.

Figure 7 shows the pharmacodynamic data according to the method of the present invention of anti-tumor drug Tegafur (S-1) for gastric cancer cells from an *ex vivo* tumor tissue obtained from mouse PDX model GAPF161.

Figure 8 shows the results of a sensitivity test for primary lung adenocarcinoma cells from a patient to drugs according to the method and the kit of the present invention.

Figure 9 shows the results of a sensitivity test for primary duodenal cancer cells from a patient to drugs according to the method and the kit of the present invention.

Detailed description of the invention

The present invention provides a method for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more candidate drugs, comprising the following steps:

- (1) transferring a primary tumor cell into an implant device;
- (2) implanting the implant device comprising the primary tumor cell into an animal;
- (3) administering the candidate drugs to the animal;
- (4) determining the sensitivity of the tumor cell to the candidate drugs.

A primary tumor cell refers to a tumor cell obtained from an *ex vivo* tumor tissue sample. In embodiments, the primary tumor cell is isolated from a tumor tissue sample of a patient, including but not limited to a tumor tissue that is clinically removed, a tumor biopsy sample etc. In embodiments, the primary tumor cell is

Claims

1、 A method for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more candidate drugs, comprising the following steps:

- 5 (1) transferring a primary tumor cell into an implant device;
 (2) implanting the implant device comprising the primary tumor cell into an animal;
 (3) administering the candidate drugs to the animal;
 (4) determining the sensitivity of the tumor cell to the candidate drugs.

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2、 The method of claim 1, wherein the primary tumor cell is obtained from an ex vivo tumor tissue sample.

3、 The method of claim 2, wherein the ex vivo tumor tissue sample is obtained from a patient, or obtained from a PDX model established using a tumor cell of a patient.

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4、 The method of any one of claims 1-3, wherein the animal is a mouse, preferably a nude mouse.

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5、 The method of any one of claims 1-4, wherein the sensitivity of the tumor cell to the candidate drugs is determined in vitro.

6、 The method of any one of claims 1-5, wherein the candidate drugs are administered to the animal orally or parenterally.

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7、 The method of any one of claims 1-6, wherein the primary tumor cell is an isolated tumor cell that has been digested and/or sorted.

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8、 The method of any one of claims 1-7, wherein the sensitivity of the tumor cell to the candidate drugs is determined 5-14 days after administering the candidate drug to the animal, preferably the sensitivity of the tumor cell to the candidate drug is

determined 5-7 days after administering the candidate drug to the animal.

9、 The method of any one of claims 1-8, wherein the implant device is a tubular device having a molecular weight cut-off value of about 500,000 Dalton, preferably a modified polyvinylidene fluoride (PVDF) tube having a molecular weight cut-off value of about 500,000 Dalton, more preferably a modified PVDF tube with an inner diameter of about 1-2mm having a molecular weight cut-off value of about 500,000 Dalton.

10、 The method of any one of claims 1-9, wherein the implant device is implanted into the animal subcutaneously.

11、 A kit for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more candidate drugs, comprising an implant device, said implant device is a tubular device having a molecular weight cut-off value of about 500,000 Dalton, preferably a modified polyvinylidene fluoride (PVDF) tube having a molecular weight cut-off value of about 500,000 Dalton, more preferably a modified PVDF tube with an inner diameter of about 1-2mm having a molecular weight cut-off value of about 500,000 Dalton.

12、 The kit of claim 11, which is used for carrying out the method according to any one of claims 1-10.

13. The kit of claim 11, wherein the tubular device having a molecular weight cut-off value of about 500,000 Dalton is a sealed device.

14、 Use of the kit of any one of claims 11-13 for screening anti-tumor drugs by determining the sensitivity of a primary tumor cell to one or more anti-tumor drugs.