a plurality of target capture primer pairs specific to a plurality of target genes comprising one or more cancer-associated alteration,

wherein each target capture primer pair comprises a forward target capture primer and a reverse target capture primer specific to a target gene comprising one or more cancer-associated alteration,

wherein each forward target capture primer and each reverse target capture primer comprises a target-specific sequence at its 3' end that is specific to the target gene, a barcode sequence linker, and an adapter-specific sequence at its 5' end,

thereby generating a plurality of amplicons comprising a plurality of target gene sequences corresponding to the plurality of target genes comprising one or more cancer-associated alteration;

(c) sequencing the plurality of amplicons from step (b) to obtain a plurality of sequencing reads, wherein optionally, the sequencing is multiplex sequencing on a next-generation sequencing platform; and

(d) comparing the plurality of sequencing reads comprising one or more cancer-associated alteration with one or more pre-determined reference cancer-associated alteration profile to compute one or more likelihood score, wherein the one or more likelihood score indicates the probability of a cancer-associated alteration originating from a specific site of origin,

to thereby detect the presence of one or more cancer-associated alterations and/or determine the site of origin of a cancer-associated alteration.

[0006] In one example, the present disclosure refers to a kit for detecting one or more cancer-associated alterations and/or determining site of origin of a cancer-associated alteration within a biological sample according to the method of the first aspect, comprising a plurality of target capture primer pairs specific to a plurality of target genes comprising one or more cancer-associated alteration as defined in step (b) of the first aspect, and instructions for use in the method of the first aspect.

[0006a] In a second aspect, the present disclosure refers to a kit for detecting one or more cancer-associated alterations and/or determining site of origin of a cancer-associated alteration within a biological sample according to the method of the first aspect, comprising a plurality of target capture primer pairs specific to a plurality of target genes comprising one or more cancer-associated alteration as defined in step (b) of the first aspect, and instructions for use in the method of the first aspect, wherein optionally the kit further comprises:

- a buffer for performing a plurality of multiplexed PCR reactions,
- a DNA polymerase,
- a plurality of deoxynucleoside triphosphates (dNTPs), and
- a reagent capable of removing excess primers.

BRIEF DESCRIPTION OF DRAWINGS

[0007] The invention will be better understood with reference to the detailed description when considered in conjunction with the non-limiting examples and the accompanying drawings, in which:

[0008] Fig. 1 is an overview of the experimental workflow of the MCS testing method described herein.