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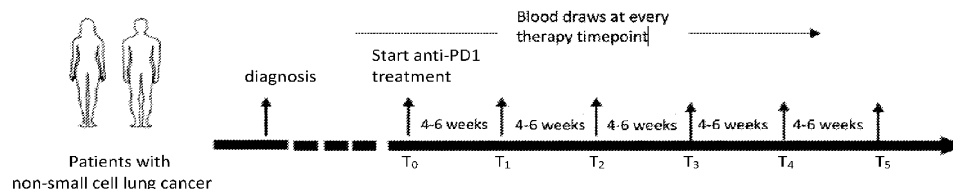
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(54) **Title:** PREDICTING AND DETERMINING EFFICACY OF A LUNG CANCER THERAPY IN A PATIENT

FIG. 1

Study design:



(57) **Abstract:** Disclosed herein are methods for monitoring a lung cancer patient during lung cancer therapy to determine whether the patient is responding to the therapy, and for predicting whether a lung cancer patient, prior to beginning lung cancer therapy, is likely to respond to the therapy. The methods involve generation and analysis of hydroxy methylation signatures, wherein, in monitoring efficacy, a patient 5hmC signature obtained during therapy is compared to a baseline 5hmC signature, while in predicting efficacy, the patient 5hmC signature is compared to a reference 5hmC profile. Analysis of 5hmC levels at certain hydroxymethylation biomarker loci indicate whether the patient is likely to benefit from or continue benefitting from a particular lung cancer therapy. The invention also provides a method for ascertaining whether a lung cancer patient is responding to a lung cancer therapy, wherein a 5hmC molecular response score MR_{5hmC} is calculated from analysis of 5hmC levels at selected 5hmC biomarker loci, with a positive value generally indicating that the patient is responding to the therapy. Data sets comprising biomarker loci that are differentially hydroxymethylated with respect to therapy response or nonresponse are also provided.

[Continued on next page]

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