Editorial Policy Checklist
This form is used to ensure compliance with Nature Research editorial policies related to research ethics and reproducibility. For further information, please see our editorial policies site. All relevant questions on the form must be answered.

Competing interests
Policy information about competing interests

Competing interests declaration
In the interest of transparency and to help readers form their own judgements of potential bias, Nature Research journals require authors to declare any competing financial and/or non-financial interest in relation to the work described in the submitted manuscript.

☐ We declare that none of the authors have competing financial or non-financial interests as defined by Nature Research.
☒ We declare that one or more of the authors have a competing interest as defined by Nature Research.

Michael H. Cho has received grant support from GSK and Bayer, consulting or speaking fees from Genentech, AstraZeneca, and Illumina. Scott T. Weiss has received royalty payments from UpToDate. The other authors have no relevant competing interests to disclose.

Authorship
Policy information about authorship

Prior to submission all listed authors must agree to all manuscript contents, the author list and its order and the author contribution statements. Any changes to the author list after submission must be approved by all authors.
☒ We have read the Nature Research Authorship Policy and confirm that this manuscript complies.

Data availability
Policy information about availability of data

Data availability statement
All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:

- Accession codes, unique identifiers, or web links for publicly available datasets
- A list of figures that have associated raw data
- A description of any restrictions on data availability

☒ We have provided a full data availability statement in the manuscript.

Mandated accession codes (where applicable)
Confirm that all relevant data are deposited into a public repository and that accession codes are provided.
☐ All relevant accession codes are provided ☐ Accession codes will be available before publication ☐ No data with mandated deposition

Code availability
Policy information about availability of computer code

Code availability statement
For all studies using custom code or mathematical algorithm that is deemed central to the conclusions, the manuscript must include a statement under the heading “Code availability” describing how readers can access the code, including any access restrictions. Code availability statements should be provided as a separate section after the data availability statement but before the References.
☒ We have provided a full code availability statement in the manuscript.
Data presentation

For all data presented in a plot, chart or other visual representation confirm that:

☑️ Individual data points are shown when possible, and always for n ≤ 10
☑️ The format shows data distribution clearly (e.g. dot plots, box-and-whisker plots)
☑️ Box-plot elements are defined (e.g. center line, median; box limits, upper and lower quartiles; whiskers, 1.5x interquartile range; points, outliers)
☑️ Clearly defined error bars are present and what they represent (SD, SE, CI) is noted

Image integrity

Policy information about Image integrity

☒ We have read Nature Research’s image integrity policy and all images comply.

Unprocessed data must be provided upon request. Please double-check figure assembly to ensure that all panels are accurate (e.g. all labels are correct, no inadvertent duplications have occurred during preparation, etc.).

Where blots and gels are presented, please take particular care to ensure that lanes have not been spliced together, that loading controls are run on the same blot, and that unprocessed scans match the corresponding figures.

Additional policy considerations

<table>
<thead>
<tr>
<th>Does not apply</th>
<th>Involved in the study</th>
</tr>
</thead>
<tbody>
<tr>
<td>☑️ Macromolecular structural data</td>
<td></td>
</tr>
<tr>
<td>☑️ Unique biological materials</td>
<td></td>
</tr>
<tr>
<td>☑️ Research animals and/or animal-derived materials that require ethical approval</td>
<td></td>
</tr>
<tr>
<td>☑️ Human embryos, gametes and/or stem cells</td>
<td></td>
</tr>
<tr>
<td>☑️ Human research participants</td>
<td></td>
</tr>
<tr>
<td>☑️ Clinical data</td>
<td></td>
</tr>
</tbody>
</table>

Human research participants

Policy information about Studies involving human research participants

Ethical compliance

☒ We have complied with all relevant ethical regulations and include a statement affirming this in the manuscript.

Ethics committee

Confirm that the manuscript states the name(s) of the board and/or institution that:

☒ Approved the study protocol ☐ OR ☐ Provided guidelines for study procedures (if protocol approval is not required)

Informed consent

☒ We have obtained informed consent from all participants and this is noted in the manuscript.

Identifiable images

For publication of identifiable images of research participants, confirm that consent to publish was obtained and is noted in the Methods. Authors must ensure that consent meets the conditions set out in the Nature Research participant release form.

☐ Yes ☒ No identifiable images of human research participants
Clinical studies
Policy information about clinical studies

Clinical trial registration
☐ We have provided the trial registration number from ClinicalTrials.gov or an equivalent agency in the manuscript.

Phase 2 and 3 randomized controlled trials
We have provided the CONSORT checklist with your submission.
☐ Yes ☐ No ☒ Not a phase 2/3 randomized controlled trial

Tumor marker prognostic studies
We have followed the REMARK reporting guidelines.
☐ Yes ☐ No ☒ Not a tumor marker prognostic study

I certify that all the above information is complete and correct.
Typed signature: Rachel S Kelly
Date: Mar 26, 2021