Reporting Summary

Nature Research wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Research policies, see Authors & Referees and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

☐ Confirmed
☐ The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
☐ A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
☐ The statistical test(s) used AND whether they are one- or two-sided
☐ Only common tests should be described solely by name; describe more complex techniques in the Methods section.
☐ A description of all covariates tested
☐ A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
☐ A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
☐ For null hypothesis testing, the test statistic (e.g. F, t, r) with confidence intervals, effect sizes, degrees of freedom and P value noted
☐ Give P values as exact values whenever suitable.
☐ For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
☐ For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
☐ Estimates of effect sizes (e.g. Cohen’s d, Pearson’s r), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection

The data were collected using Tecan SparkControl™ 2.2 software, Tecan i-control™ Software, Sciex’s Analyst 1.6.3 software, UVProbe Multifunctional UV Control Software, and Microsoft Excel 365. The custom code used for analyzing photos is available through this link [Kinetic/analyse/master.js]: https://script.epfl.ch/script/H0>Login/OWNyswFvpd?path=test%40patiny.com%2FResearch%2FLIP

Data analysis

The data were analyzed using commercial software Sciex’s MultiQuant 3.0.2, Microsoft Excel 365 and Origin 8.0. The custom code used for analyzing photos is available through this link [Kinetic/analyse/master.js]: https://script.epfl.ch/script/H0/Login/OWNyswFvpd?path=test%40patiny.com%2FResearch%2FLIP

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors/reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Research guidelines for submitting code & software for further information.

Data

Policy information about availability of data

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

The data that support the findings of this study are available from the corresponding author upon request.
Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

- Life sciences  
- Behavioural & social sciences  
- Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose on these points even when the disclosure is negative.

Sample size  
No sample-size calculation was performed. The conventional sample size for pilot animal studies was used in this study.

Data exclusions  
No data were excluded from the analysis.

Replication  
For the reported data, all measurements using instruments and sensors were repeated 3 times. All attempts at replication were successful.

Randomization  
All C57BL/6J male mice involved in the study were considered equal before group allocation. The mice were then allocated randomly into experimental groups. The plasma samples were collected randomly after arriving at the Clinical Chemistry Laboratory of University Hospital of Lausanne.

Blinding  
The investigators were blinded to group allocation during data collection and analysis.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.

Materials & experimental systems

<table>
<thead>
<tr>
<th>n/a</th>
<th>Involved in the study</th>
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<td>☒</td>
<td>Antibodies</td>
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<td>☒</td>
<td>Eukaryotic cell lines</td>
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<td>Palaeontology</td>
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<td>Animals and other organisms</td>
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<td>Human research participants</td>
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<td>Clinical data</td>
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Methods

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<td>Flow cytometry</td>
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<td>MRI-based neuroimaging</td>
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Eukaryotic cell lines

Policy information about: cell lines

Cell line source(s)  
HFK-293 cell were obtained from DSMZ [ACC 305]

Authentication  
The cells were cultured directly from the received product. No further authentication was performed.

Mycoplasma contamination  
All cell lines were tested negative for mycoplasma contamination.

Commonly misidentified lines  
None.

(See ICTAC register)

Animals and other organisms

Policy information about: studies involving animals, ARRIVE guidelines recommended for reporting animal research

Laboratory animals  
C57BL/6J male mice, 8 weeks of age.

Wild animals  
The study did not involve wild animals.

Field-collected samples  
The study did not involve samples collected from the field.

Ethics oversight  
All animal experiments were carried according to national Swiss and European Union ethical guidelines and approved by the local animal experimentation committee of the Canton de Vaud under license #2465.
Note that full information on the approval of the study protocol must also be provided in the manuscript.

### Human research participants

<table>
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<tr>
<th>Policy information about</th>
<th>studies involving human research participants</th>
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<tr>
<td>Population characteristics</td>
<td>No preset population characteristics were used when collecting plasma samples. As the study aims to compare two methods for quantifying plasma lactate dehydrogenase levels, 0.5 ml of patient plasma samples arriving at the Clinical Chemistry Laboratory of University Hospital of Lausanne were selected randomly without any preset criteria. All information regarding the patients from whom the plasma samples were collected were kept confidential from the experimenter.</td>
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<tr>
<td>Recruitment</td>
<td>The study does not involve patient recruitment. Plasma samples without patient information were collected randomly after arriving at the Clinical Chemistry Laboratory of University Hospital of Lausanne.</td>
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<td>Ethics oversight</td>
<td>University Hospital of Lausanne</td>
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