

Reporting Summary

Nature Portfolio 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 Portfolio policies, see our [Editorial Policies](#) 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.

n/a 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

Data analysis

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 and reviewers. We strongly encourage code deposition in a community repository (e.g. GitHub). See the Nature Portfolio [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 description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our [policy](#)

Individual participant data are not directly available but may be available after study close upon reasonable request from the authors. According to the General Data Protection Regulation of the European Union (679/2016), the principles of data protection should apply to any information concerning an identified or identifiable natural person and that personal data which have undergone pseudonymization, which could be attributed to a natural person by the use of additional information should be considered to be information on an identifiable natural person. Thus, according to the GDPR, all pseudonymized data are considered personal data and

cannot be published openly. Therefore, we are bound to the law and to the strict hospital policies, and are unable to share the data directly. However, the institutional (Helsinki and Uusimaa Hospital District) contact details for potential future data requests are as follows: [\url{https://huspalvelu.microsoftportals.com/fi-FI/}](https://huspalvelu.microsoftportals.com/fi-FI/).

Human research participants

Policy information about [studies involving human research participants and Sex and Gender in Research](#).

Reporting on sex and gender

We included patients with obesity (n=44, aged 46.6 years with 14 men and 30 women, 26 patients with obesity and 18 patients with obesity and T2DM, matched for age and diabetes status between the operation types), who were examined before, and at 6th and 12th months after bariatric surgery with either Roux-en-Y gastric bypass (RYGB; n=24, 8 men, 16 women, n=9 with T2DM), or One-Anastomosis gastric bypass (OAGB; n=20, 6 men, 14 women, n=9 with T2DM). 33% of men vs. 43% of women had T2DM (p=0.836). The subjects were recruited from Helsinki University Hospital, through the Department of Gastrointestinal Surgery. The full randomized clinical trial is registered at [\href{https://www.clinicaltrials.gov/ct2/show/study?term=NCT02882685&rank=1}](https://www.clinicaltrials.gov/ct2/show/study?term=NCT02882685&rank=1) {NCT02882685} and described in detail in [\citet{saarinen2019prospective}](#) and [\citet{heinonen2023roux}](#). Written informed consent was obtained from all participants. The study protocol was designed and performed according to the principles of the Helsinki Declaration and approved by the Ethical Committee of the Helsinki University Central Hospital.

Population characteristics

See above.

Recruitment

See above.

Ethics oversight

Ethical Committee of the Helsinki University Central Hospital

Note that full information on the approval of the study protocol must also be provided in the manuscript.

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](https://www.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

Inclusion Criteria:

BMI>35

18 Years to 65 Years (Adult, Older Adult)

Data exclusions

Exclusion Criteria:

Pregnancy

Previous bariatric surgery

Anemia

esophagitis (LA B-D)

esophageal intestinal metaplasia

Replication

2 different test, oral glucose tolerance test (OGTT) and mixed meal test (MMT) are applied in following days.

Randomization

We included patients with obesity (n=44, aged 46.6 years with 14 men and 30 women, 26 patients with obesity and 18 patients with obesity and T2DM, matched for age and diabetes status between the operation types)

Blinding

Blinding was not necessary since comparisons made by blood samples.

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

n/a	Involved in the study
☒	☐ Antibodies
☒	☐ Eukaryotic cell lines
☒	☐ Palaeontology and archaeology
☒	☐ Animals and other organisms
☐	☒ Clinical data
☒	☐ Dual use research of concern

Methods

n/a	Involved in the study
☒	☐ ChIP-seq
☒	☐ Flow cytometry
☒	☐ MRI-based neuroimaging

Clinical data

Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration NCT02882685

Study protocol

Individual participant data are not directly available but may be available after study close upon reasonable request from the authors. According to the General Data Protection Regulation of the European Union (679/2016), the principles of data protection should apply to any information concerning an identified or identifiable natural person and that personal data which have undergone pseudonymization, which could be attributed to a natural person by the use of additional information should be considered to be information on an identifiable natural person. Thus, according to the GDPR, all pseudonymized data are considered personal data and cannot be published openly. Therefore, we are bound to the law and to the strict hospital policies, and are unable to share the data directly. However, the institutional (Helsinki and Uusimaa Hospital District) contact details for potential future data requests are as follows: [\url{https://huspalvelu.microsoftcrmportals.com/fi-FI/}](https://huspalvelu.microsoftcrmportals.com/fi-FI/).

Data collection

The subjects were recruited from Helsinki University Hospital, through the Department of Gastrointestinal Surgery.

Outcomes

Main outcome is weight-loss at 1 year after the operation. Weight-loss is calculated as excess weight-loss compared to the preoperative weight 2 months before the operation.

2 months before the operation glucose homeostasis status is studied (oral glucose tolerance test). Oral glucose tolerance tests will be repeated at 6 months and 12 months. Continuous glucose monitoring will be done before the operation at operation and 6 months after the operation

All patients undergo a gastroscopy prior to inclusion. Patients with Barrett's esophagus or LA B-C esophagitis are excluded. The first 30 patients, who are randomized to Mini Gastric Bypass will undergo a gastroscopy and a hepatobiliary scintigraphy 6 months after the operation. At hepatobiliary scintigraphy the amount of bile reflux is calculated as the amount of tracer found in the gastric pouch or esophagus in relation to total amount of tracer in the liver.

Weight-loss at 2 years, 5 years and 10 years