

CV

Nicole Bender

Current position(s): Group leader

Academic age: 8 year(s) 9 month(s)

Education

Degree	Organisation	Duration
PD, habilitation	Universität Zürich - ZH, CH Institute of Evolutionary Medicine	04.2018 - 03.2019 1 year(s)
Medical Specialisation in Prevention and Public Health FMH	Universität Bern - BE, CH Institute of Social and Preventive Medicine	10.2005 - 02.2010 4 year(s) 5 month(s)
Master: Master Epidemiology by distance learning	London School of Hygiene & Tropical Medicine, GB Epidemiology	09.2005 - 12.2009 4 year(s) 4 month(s)
PhD / Dr.: MD PhD	Universität Bern - BE, CH Department of Ecology and Evolution	09.2001 - 02.2006 4 year(s) 6 month(s)
MD: Dr. med.	Universität Bern - BE, CH Medical Faculty	09.1996 - 10.2004 8 year(s) 2 month(s)
State examination: Human Medicine	Universität Bern - BE, CH Medical Faculty	09.1992 - 11.1998 6 year(s) 3 month(s)

Employment

Role	Organisation	Duration
Group leader	Universität Zürich - ZH, CH Institute of Evolutionary Medicine	05.2016 - Present 9 year(s) 5 month(s)
Research associate / Scientific collaborator	Universität Bern - BE, CH Institute of Social and Preventive Medicine	09.2005 - 04.2016 10 year(s) 8 month(s)
Doctoral student / PhD student	Universität Bern - BE, CH Department of Ecology and Evolution	09.2001 - 08.2005 4 year(s)
Medical resident / Assistant doctor	Universität Bern - BE, CH Department of Psychiatry	03.1999 - 08.2001 2 year(s) 6 month(s)

Major achievements

Achievement 1

One of the most relevant achievements of Nicole Bender was for sure the successful establishment of the ongoing cohort study at the Scan Lab of the Institute of Evolutionary Medicine at the University of Zurich, starting in 2019. In this running cohort project, a large quantity of health risk factors such as dietary intake, physical activity, sociodemographic factors, body self-image, and body satisfaction are assessed by validated questionnaires. Anthropometry is assessed with a 3D full body scanner and body composition is measured with a bioelectric impedance analyser (BIA). We associate the health risk factors from the questionnaire with outcome measures such as BMI, fat mass, muscle mass, visceral fat mass, and body hydration measures. We analyse the data separately by sex and according to age groups. Out of this ongoing cohort a number of publications arose or are in the process of publication, and several Master students successfully wrote their Master theses. In 2025 we successfully started a subcohort focusing on strength and endurance athletes.

[1] journal-article. Sob, C., Giacone, L., Staub, K., Bender, N., Siegrist, M., Hartmann, C. 2021. Drawings or 3D models: Do illustration methods matter when assessing perceived body size and body dissatisfaction? PLOS ONE. [DOI](#).

[2] journal-article. Ekingen, T., Sob, C., Hartmann, C., Rühli, F.J., Matthes, K.L., Staub, K., Bender, N. 2022. Associations between hydration status, body composition, sociodemographic and lifestyle factors in the general population: A cross-sectional study. BMC Public Health. [DOI](#).

[3] journal-article. Krznar, B., Vilenica, M., Ruehli, F., Bender, N. 2024. Lifestyle and BMI changes after the release of COVID-19 restrictions: do humans go 'back to normal'? Biology, 13(11):858. [DOI](#).

Achievement 2

Another achievement is Nicole Bender's expertise in the field of nutrition and body composition in Switzerland, especially in connection with systematic reviews and meta-analyses, that she reached during several years. This expert role led to several commissioned works by the Federal Office of Public Health (BAG) or the Federal Food Safety and Veterinary Office (BLV), as well as by the Swiss Armed Forces (in collaboration with her colleague Kaspar Staub) on topics related to nutrition and body composition. Nicole Bender was also part of several expert panels, such as for instance the group who was commissioned by the BLV to update the EEK report of 2019 on the scientific evidence linking consumption of specific food groups to non-communicable diseases. This update shall eventually lead to update the Swiss Food Pyramid.

Nicole Bender not only published her work in peer-reviewed journals, but she also wrote several book chapters and also two books on topics related to nutrition and body composition, but also on the life course approach and on evolutionary considerations of health and disease. Especially this last point makes her expertise special in Switzerland. While there are several excellent experts on nutrition and body composition in Switzerland, few study the subject from an evolutionary point of view. The evolutionary view adds a deep biological understanding of the ultimate causes of obesity and allows novel insights into potential preventive approaches, such as subgroup-specific preventive targeting according to early life course events, or according to microbiome-environmental interactions.

- [1] journal-article. S, W., L, S., L, A., K, S., F, R., & N, B. (2021). National guidelines on nutrient reference values for the healthy adult population and for pregnant or lactating women are based on heterogeneous sources of evidence: review of guidelines. *Nutrition Reviews*. <https://doi.org/10.1093/nutrit/nuaa062>. [DOI](#).
- [2] journal-article. N, B., P, M.-V., P, P., N, R., K, S., LS, S., & van der Horst K. (2020). Children's dietary assessment and promotion: The Swiss situation. *International Journal of Public Health*. <https://doi.org/10.1007/s00038-020-01393-4>. [DOI](#).
- [3] journal-article. R, F. A., K, S., L, A., P, E., F, R., & N, B. (2019). Mindful eating and common diet programs lower body weight similarly: Systematic review and meta-analysis. *Obesity Reviews : An Official Journal of the International Association for the Study of Obesity*. <https://doi.org/10.1111/obr.12918>. [DOI](#).
- [4] journal-article. L, V., JP, K., J, B., G, P., N, B., S, R., D, F., & K, S. (2019). Clustering of sociodemographic and lifestyle factors among adults with excess weight in a multilingual country. *Nutrition (Burbank, Los Angeles County, Calif.)*. <https://doi.org/10.1016/j.nut.2019.01.001>. [DOI](#).
- [5] journal-article. Meili, S., Brabec, M., Rühli, F., Buehrer, T.W., Gültekin, N., Stanga, Z., Bender, N., Staub, K., Reber, E. 2022. Body mass index in young men in Switzerland after the national shutdowns during the COVID-19 pandemic. *European Journal of Public Health*, Aug 22;ckac111. [DOI](#).
- [6] journal-article. Sutter D.O., Bender, N. 2021: Nutrient status and growth in vegan children. *Nutrition Research*, 91, 13-25. . [DOI](#).
- [7] report. Swiss dietary recommendations: scientific background. Final report. 26 October 2022. Pedro Marques-Vidal; Esther Infanger; Béatrice Baumer; Klazine Van der Horst; Undine Lehmann; Nicole Bender; Sarah Pannen; Nena Karavasiloglou; Sabine Rohrmann; Yassmeen El Maohub; Camilla Speranza; Suzanne Suggs; Martina Alig; Carmen Sangin; Sophie Frei; Matthias Meier. . Website. [Open Access](#).

Achievement 3

The most relevant achievement for the actual proposal is our progress done in the WEAVE project "Genetic variants of the mechanosensitive ion channel Piezo1 - their role in human red blood cell physiology and evolution" (310030E_215931). Over the first 30 months, we consolidated a Zurich-centric experimental stack for red-cell oxygen transport and mechanistic readouts, built around

HEMOX-based ODC/ P_{50} profiling, high-resolution O_2 release assays, and quantitative RBC phenotyping. In parallel, our work in progress demonstrates that pharmacological activation of PIEZO1 with Yoda1 produces a left-shift of the ODC in human RBCs, with a stronger effect at mildly acidic pH (maternal–fetal interface conditions) and Ca^{2+} dependence, a direct experimental foothold for the maternal off-loading hypothesis and for the pharmacology-first design.

More specifically, our preliminary work shows that a PIEZO1 pharmacologic activation leads to a left-shifted oxygen dissociation curve: After 2 h of Yoda1 exposure, RBCs display a pronounced P_{50} decrease, stronger at acidic pH, with Ca^{2+} dependence, experimentally aligning with the maternal off-loading deficit. Furthermore, our WEAVE methods embed HEMOX and Oroboros/UT7-Epo; these now operate as routine assays, letting us triangulate P_{50} , dynamic O_2 delivery, and cell state (rheology, Ca^{2+} /pH/redox) in the same donor samples.
