

Skin microbiota analysis in patients with anorexia nervosa and healthy-weight controls reveals microbial indicators of healthy weight and associations with the antimicrobial peptide psoriasin

Hermes, Britt M.^{1,2,3*}, Rademacher, Franziska⁴, Chung, Cecilia¹, Tiegs, Gisa⁵, Bendix, Marie-Christin⁶, de Zwaan, Martina⁶, Harder, Jürgen^{4*+}, Baines, John F.^{1,2*+}

Author affiliations

¹ Max Planck Institute for Evolutionary Biology, Plön, Germany

² Section of Evolutionary Medicine, Institute for Experimental Medicine, Kiel University, Kiel, Germany

³ Lübeck Institute of Experimental Dermatology, University of Lübeck, Lübeck, Germany

⁴ Department of Dermatology, University Hospital Schleswig-Holstein, Kiel, Germany

⁵ Institute of Experimental Immunology and Hepatology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany.

⁶ Department of Psychosomatic Medicine and Psychotherapy, Hannover Medical School, Germany

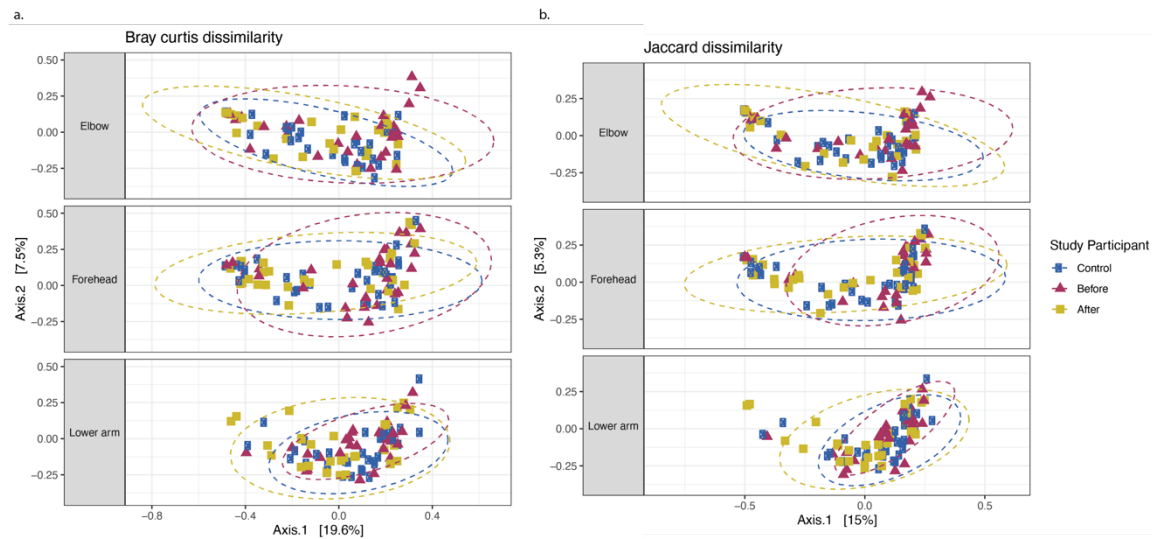
⁺ These authors jointly supervised this work: Harder, Jürgen and Baines, John F.

^{*} Corresponding authors: hermes@evolbio.mpg.de; baines@evolbio.mpg.de; jharder@dermatology.uni-kiel.de

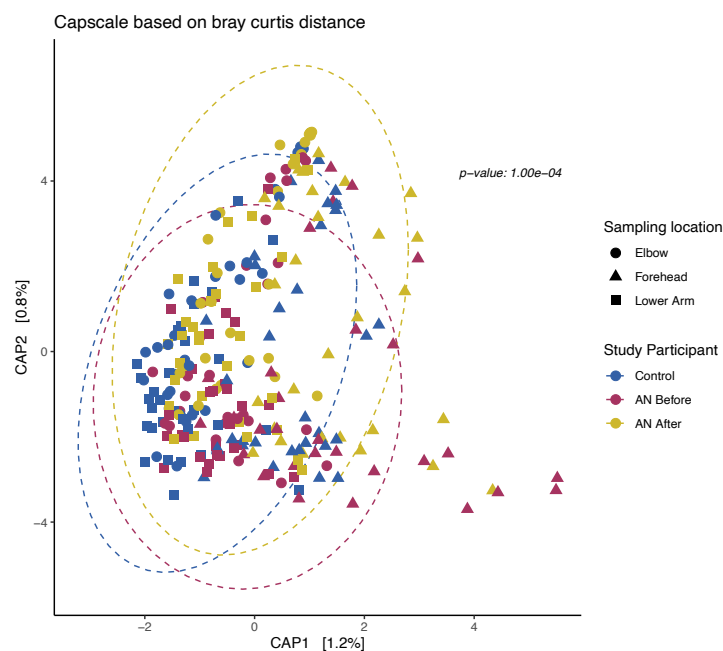
Abbreviations: anorexia nervosa (AN), antimicrobial peptide (AMP), body mass index (BMI), amplicon-sequence variants (ASV)

Supplementary Figures

- **Supplementary Figure S1.** Beta diversity
- **Supplementary Figure S2.** Constrained analysis of principal coordinates of the Bray–Curtis dissimilarity index
- **Supplementary Figure S3.** Spearman correlations between indicator *Abiotrophia* and psoriasin concentrations
- **Supplementary Figure S4.** Box plots of relative abundances of *Staphylococcus*, *Propionibacterium*, and the sum relative abundance for *Staphylococcus*, *Propionibacterium*, and *Lactobacillus*

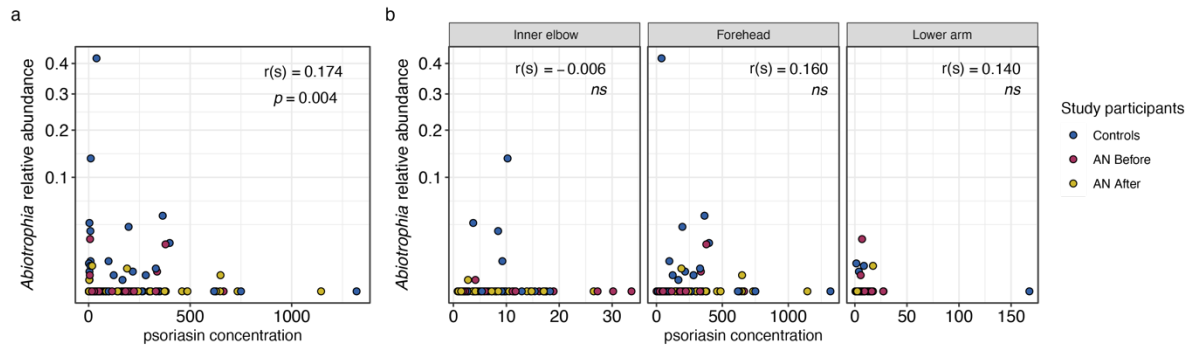


Supplementary Figure 1. Beta diversity based on a. Bray-Curtis dissimilarity index by sampling location and b. Jaccard index by sampling location. Blue represents healthy-weight controls, red represents patients with AN before weight gain, and gold represents patients with AN after weight gain. AN = anorexia nervosa

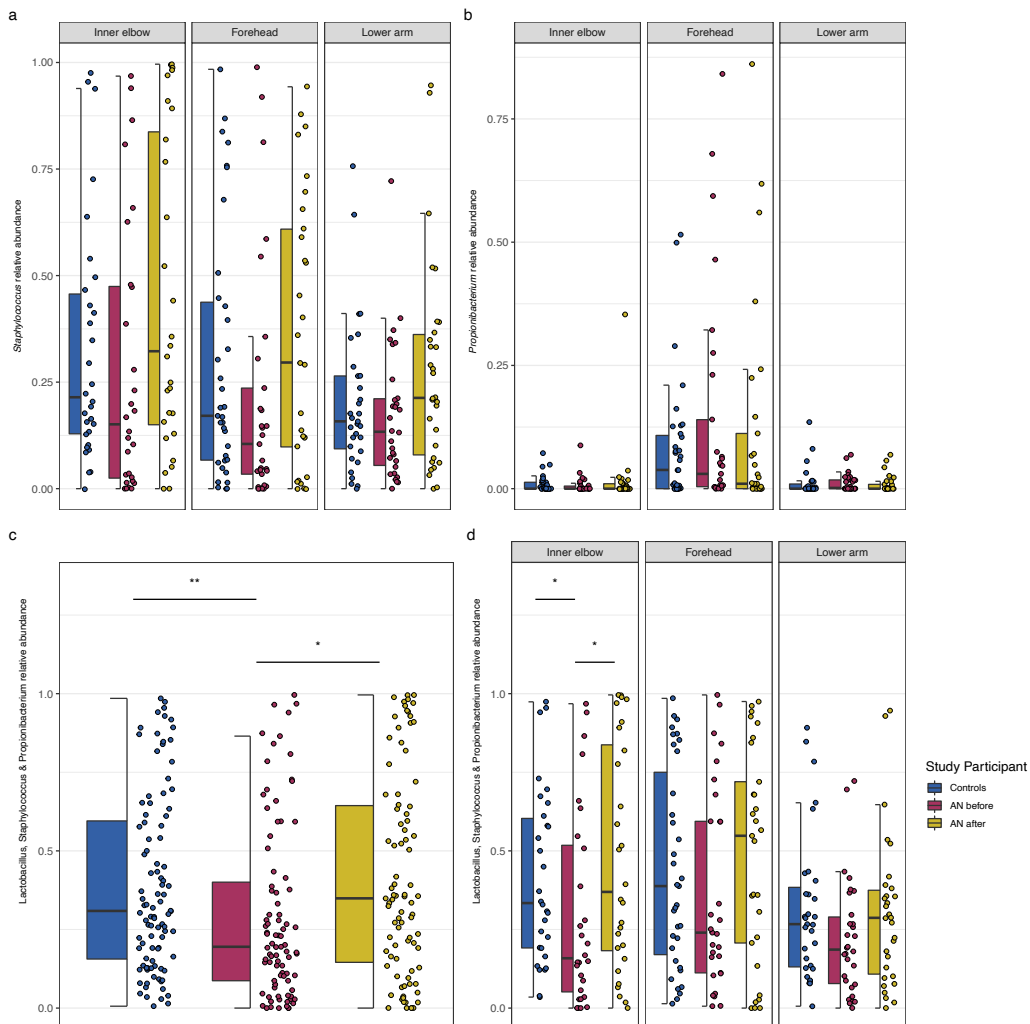


Supplementary Figure 2. Constrained analysis of principal coordinates of the Bray-Curtis dissimilarity index with respect to treatment status. Blue represents healthy-weight controls, red represents patients with AN before weight gain, and gold represents patients with AN after weight gain. AN = anorexia nervosa

Skin microbiota in anorexia nervosa



Supplementary Fig S3. Spearman correlations between indicator *Abiotrophia* and psoriasis concentrations a. at all locations and b. faceted by sampling location. $r(s)$ = spearman's Rho. AN = anorexia nervosa. ns = not significant. Blue represents healthy-weight controls, red represents patients with AN before weight gain, and gold represents patients with AN after weight gain. p -values were adjusted for multiple testing according to Benjamini and Hochberg (1995).



Supplementary Fig S4. Box plots of a. *Staphylococcus* and b. *Propionibacterium* relative abundances for healthy-weight controls and patients with AN, by weight gain arm (before and after) and, c. Sum totals of relative abundances of *Staphylococcus*, *Propionibacterium*, and *Lactobacillus* for healthy-weight controls and patients with AN, by weight gain arm

(before and after) and, **d.** faceted by sampling location. Wilcoxon test (see Methods); *p*-values: * <0.05; ** < 0.01; *** < 0.001. *p*-values were adjusted for multiple testing according to Benjamini and Hochberg (1995). Line indicates the median concentration; box shows the interquartile range (IQR), and the whiskers are 1.5x IQR. Blue represents healthy-weight controls, red represents patients with AN before weight gain, and gold represents patients with AN after weight gain. Summary statistics provided in Supplementary Table S4. AN = anorexia nervosa