

# Adhesion Forces of Oral Bacteria to Titanium and the Influence of Cellular Characteristics

Katharina Doll<sup>1,4\*</sup>, Andreas Winkel<sup>1,4</sup>, Ines Yang<sup>1,4</sup>, Anna Josefine Grote<sup>1,4</sup>, Nils Meier<sup>2</sup>, Mosaieb Habib<sup>3,4,5</sup>, Henning Menzel<sup>2</sup>, Peter Behrens<sup>3,4,5</sup>, Meike Stiesch<sup>1,4</sup>

<sup>1</sup> Department of Prosthetic Dentistry and Biomedical Materials Science, Hannover Medical School, Carl-Neuberg-Str. 1, 30625 Hannover, Germany

<sup>2</sup> Institute for Technical Chemistry, Technische Universität Braunschweig, Hagenring 30, 38106 Braunschweig, Germany

<sup>3</sup> Institute of Inorganic Chemistry, Leibniz University Hannover, Callinstr. 9, 30167 Hannover, Germany

<sup>4</sup> Lower Saxony Centre for Biomedical Engineering, Implant Research and Development (NIFE), Stadtfeldamm 34, 30625 Hannover, Germany

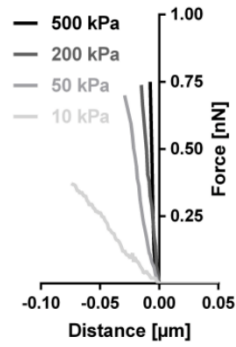
<sup>5</sup> Cluster of Excellence Hearing4All, Hannover, Germany

\* Correspondence: doll.katharina@mh-hannover.de

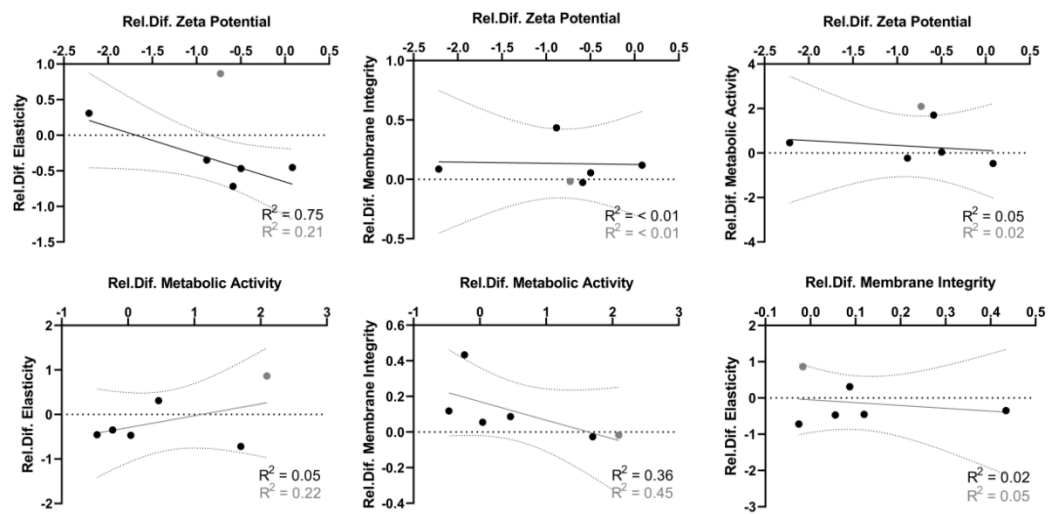
**Table S1.** Parameter settings for analysis of force-distance curves from single cell force spectroscopy using the AtomicJ software.[1]

Parameter	Setting
<b>Processing – Automatic</b>	
Contact estimator	Classical golden
Estimation method	based on contact model
Model fit	Classical (L2)
Fit to	Withdraw (for maximum adhesion, attachment points, and detachment distance) Approach (for Young's modulus)
<b>Model</b>	
Model	Sphere (JKR)
Radius (µm)	0.375 (for <i>S. oralis</i> , <i>P. gingivalis</i> and <i>A. ac</i> ) 0.5 (for <i>A. naeslundii</i> ) 0.5 (for <i>V. dispar</i> )
<b>Sample</b>	
Poisson ratio	0.5
Adhesive energy	Calculate from fit
<b>Calibration</b>	
Spring (N/m)	Read-in
Sensitivity (µm/V)	Read-in

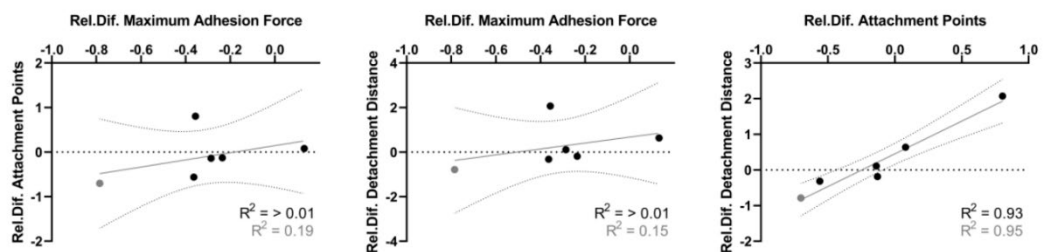
[1] Hermanowicz, P.; Sarna, M.; Burda, K.; Gabrys, H. AtomicJ: An Open Source Software for Analysis of Force Curves Review of Scientific Instruments 2014, 85, 063703.



**Figure S1.** Representative force distance curves for indicated Young's moduli measured as bacterial cell elasticity.



**Figure S2.** Linear regression analysis between different cellular parameters across species. Each black dot represents the relative difference of respective values in PBS to RTF buffer for one species. Values for *S. oralis* are shown as grey dots. Linear regression fit is shown with 95 % confidence interval and the corresponding correlation coefficient  $R^2$ . For black lines and  $R^2$ , *S. oralis* was excluded from calculation. Grey lines and  $R^2$  also include the grey values of *S. oralis*.



**Figure S3.** Linear regression analysis between different adhesion force parameters across species. Each black dot represents the relative difference of respective values in PBS to RTF buffer for one species. Values for *S. oralis* are shown as grey dots. Linear regression fit is shown with 95 % confidence interval and the corresponding correlation coefficient  $R^2$ . For black lines and  $R^2$ , *S. oralis* was excluded from calculation. Grey lines and  $R^2$  also include the grey values of *S. oralis*.