

When Stem Cells Roll: A Microfluidic Analysis of the Catch Bond Mediated Interaction between CD44 and Hyaluronic Acid

Maximilian Hanke^{1,2,3,4}, Isabel Taubert³, Christof Christophis^{1,2}, Natalia Baran³, Patrick Wuchter³, Anthony Ho³, Axel Rosenhahn^{2,4}

1: Institut für funktionelle Grenzflächen Karlsruher Institut für Technologie (KIT), PO Box 3640, 76021 Karlsruhe, Germany

2: Angewandte Physikalische Chemie, Ruperto Carola Universität Heidelberg, Im Neuenheimer Feld 253, 69160 Heidelberg, Germany

3: Universitätsklinikum Heidelberg, Innere Medizin V, Im Neuenheimer Feld 410, 69120 Heidelberg, Germany

4: Analytische Chemie – Biointerfaces, Ruhr-Universität Bochum, 44780 Bochum, Germany

CD44 is a cell surface receptor which is involved in extravasation processes during haematopoiesis and homing^[1,2] and angiogenesis and tumour metastasis.^[3] In this study we focused on examining the interaction of the CD44⁺ model cell line KG-1a with hyaluronic acid (HA) under flow conditions in detail by using a self-built microfluidic shear force setup^[4,5] The study was then extended to human haematopoietic CD34⁺ cells from umbilical cord blood and the bone marrow revealing a catch bond activation for all cells types studied. Antibody experiments reveal that in all cases CD44 is the relevant receptor involved in the catch bond mechanism. Interestingly, the threshold for activation seems to be independent of the differentiation state of the cell, i.e. bone marrow cells show the same activation threshold as cord blood cells.

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