**Title:** An insight into the stages of ion leakage during red blood cell storage

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| Cell Name | Diameter 1 - Diameter 2 [μm] | Height 1 - Height 2 [μm] | Height / Diameter | Spicules |
|---|---|---|---|---|
| Discocyte | ≤ 0.2 | ≤ 0.3 | | no |
| Eliptocyte | ≥ 1.0 | | | no |
| Codocyte | | | > 0.35 | no |
| Stomatocyte | < 1.0 | | | no |
| Echinocyte | | | | yes |
| Spheroechinocyte | | | > 0.35 | yes |
| Spherocyte | | | > 0.35 | no |

**Table S1**. Table with cell naming criteria used for analysis of RBCs morphological changes during 6 week storage.

| Ions | Extracellular [mmol/L] | Intracellular [mmol/L] |
|---|---|---|
| $[Na^+]$ | 135-145 | 10 |
| $[Cl^-]$ | 95-105 | 3 |
| $[K^+]$ | 3.8-5.5 | 159 |
| $[HCO_3^-]$ | 22-28 | 7 |
| $[H^+]$ | $36 \times 10^{-6} - 44 \times 10^{-6}$ | $63 \times 10^{-6}$ |

**Table S2**. Reference ranges of extracellular and intracellular concentrations of $Na^+$, $Cl^-$, $K^+$, $HCO_3^-$ and $H^+$ ions in human blood in adults. Zapala B. et al. Laboratory Diagnostics with Elements of Clinical Biochemistry. Book, 2017:874-886; Casey JR, et al. Nat Rev Mol Cell Biol. 2010;11(1):50-61; Rhoades R. et al. Medical Physiology : Principles for Clinical Medicine. Book 2009.

| Parameter | Unit | Reference range |
|:---:|:---:|:---:|
| Lactates | mmol/L | 0.6-2.2 |
| Glucose* | mmol/L | 3.9-5.5 |
| free Fe | μmol/L | ♂ 14-32 |
| | | ♀ 11-29 |
| RBC | mln/μL | ♂ 3.91-5.11 |
| | | ♀ 3.91-5.61 |
| HGB | g/dL | ♂ 13.2-17.3 |
| | | ♀ 11.7-15.5 |
| HCT | % | ♂ 38-51 |
| | | ♀ 33-45 |
| MCV | fL | 86-98 |
| MCH | pg | 28-33 |
| MCHC | g/dL | 32-36 |

*fasting

**Table S3**. Reference ranges of main biochemical (lactates, fasting glucose, free Fe) and morphological (RBC, HGB, HCT, MCV, MCH, MCHC) parameters in adults, with a division based on gender (♂ - males, ♀ - females) for free Fe, RBC, HGB and HCT values. Zapala B. et al. Laboratory Diagnostics with Elements of Clinical Biochemistry. Book, 2017:874-886.
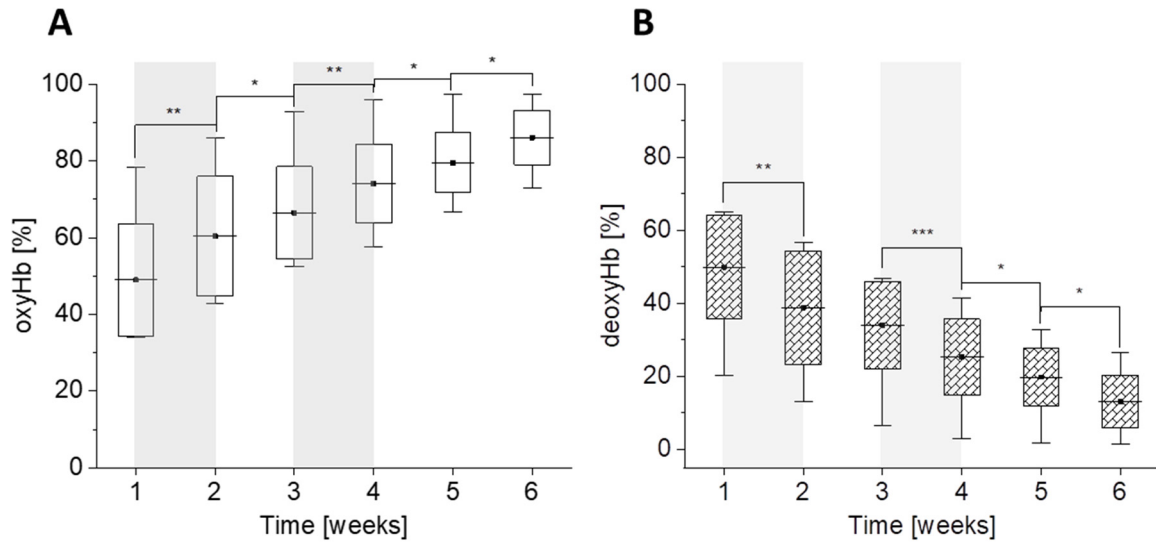
**Figure S1**. Percentage changes of the oxyHb (**A**) and deoxyHb (**B**) during storage pRBCs. The most prominent changes are marked gray. Data distribution is presented as box plots (mean value, mean ± SD, min-max). Statistical significance of the obtained values was tested with Kruskal-Wallis ANOVA nonparametric test (null = not significant;; *$p$ <0.05; **$p$ <0.01, ***$p$ <0.001).
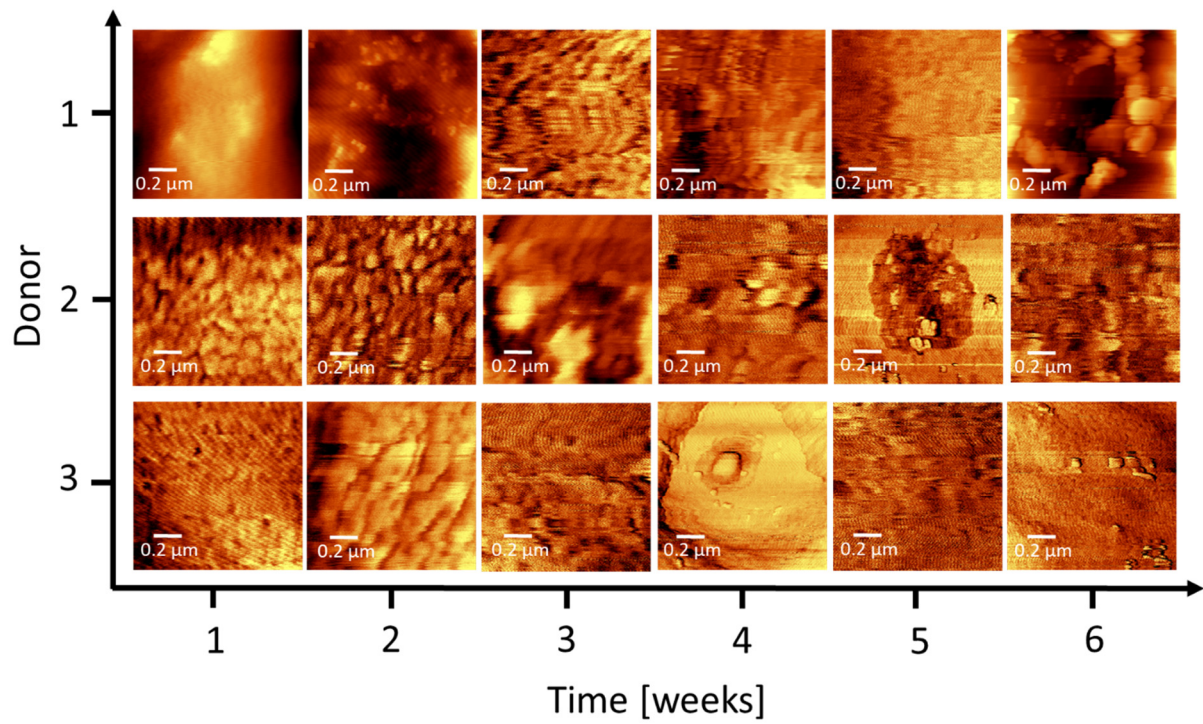
**Figure S2**. Representative nanoscale AFM images of RBCs' surface changes collected in scale 1.5 × 1.5 μm² during 6 weeks storage of the pRBCs for three donors.