

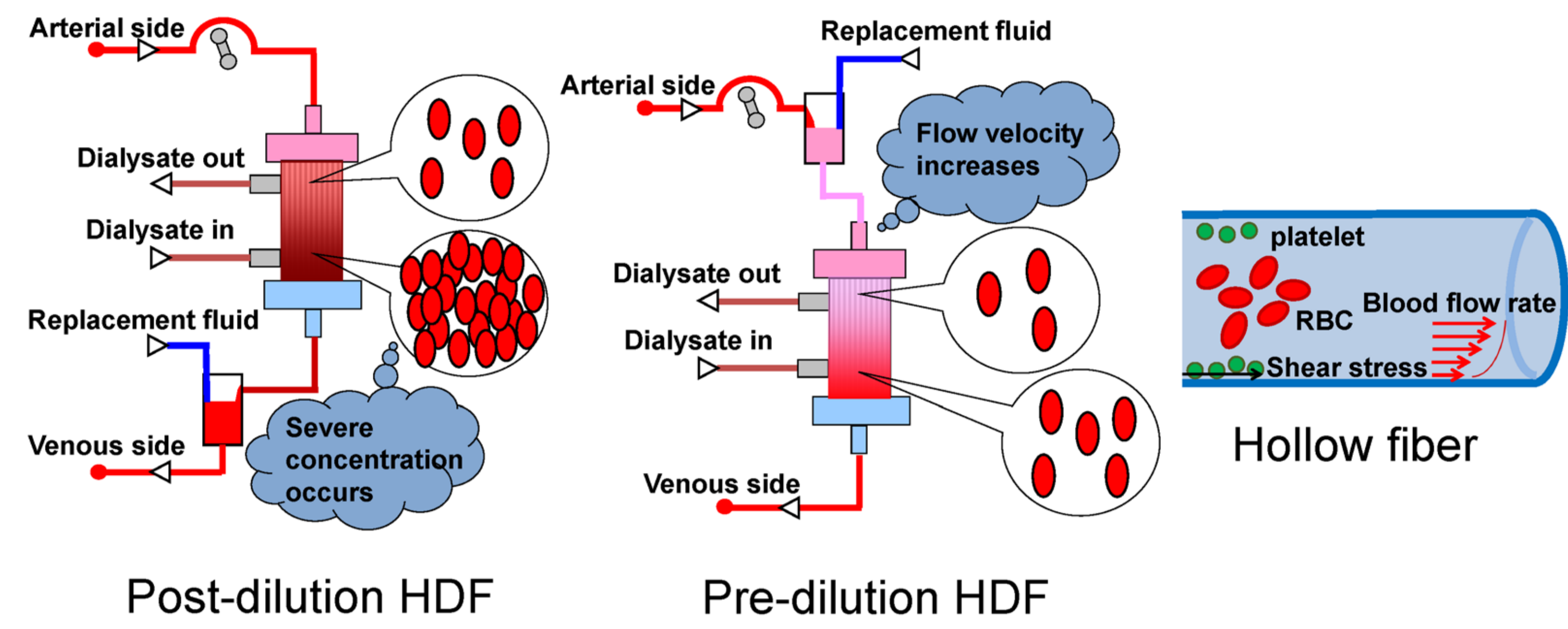
COMPARISON OF THE EFFECTS OF PRE- AND POST-DILUTION ON-LINE HEMODIAFILTRATION ON THE CELL SURFACE AND OTHER INFLAMMATORY MARKERS

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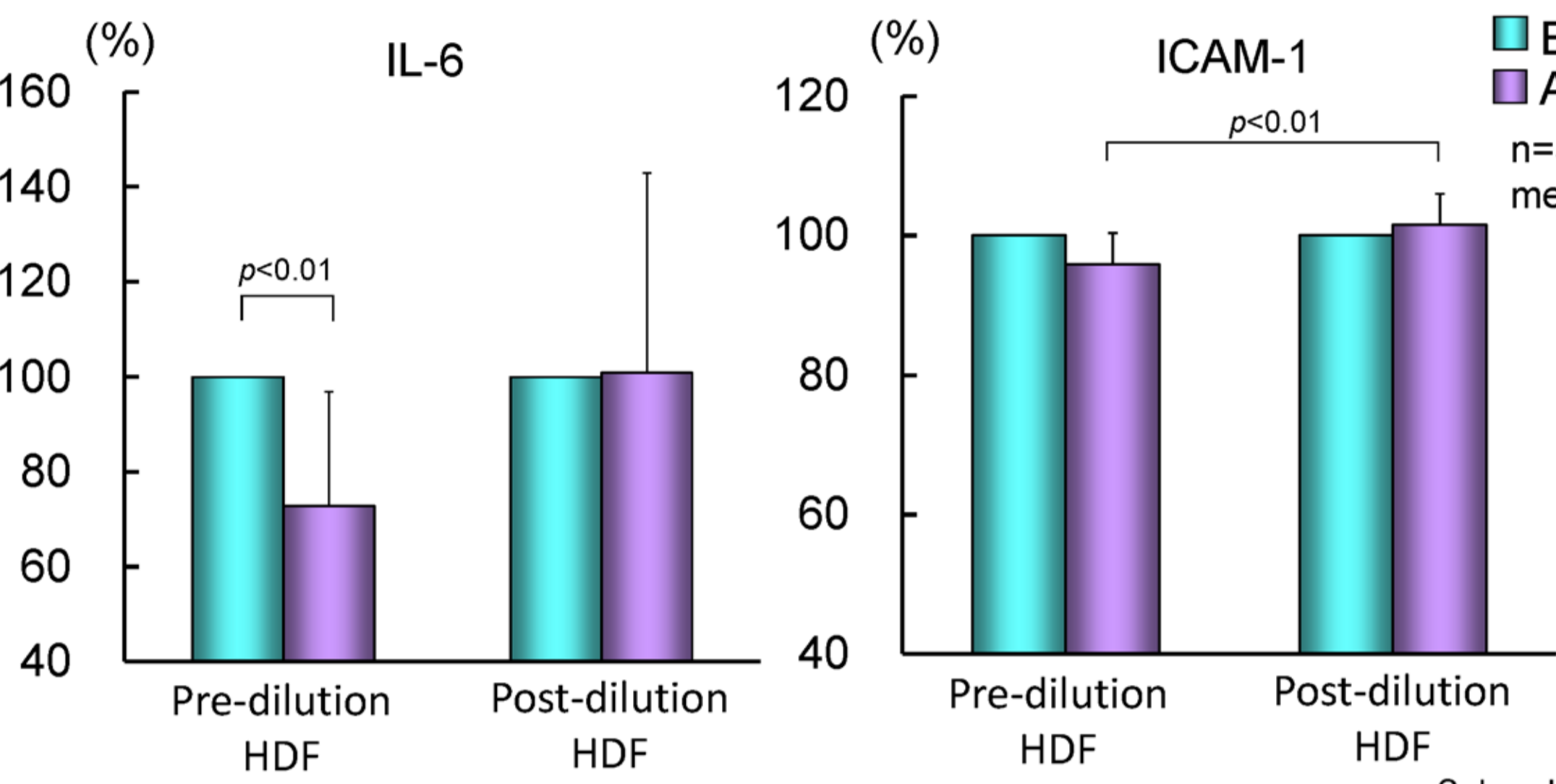
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Introduction and Aims

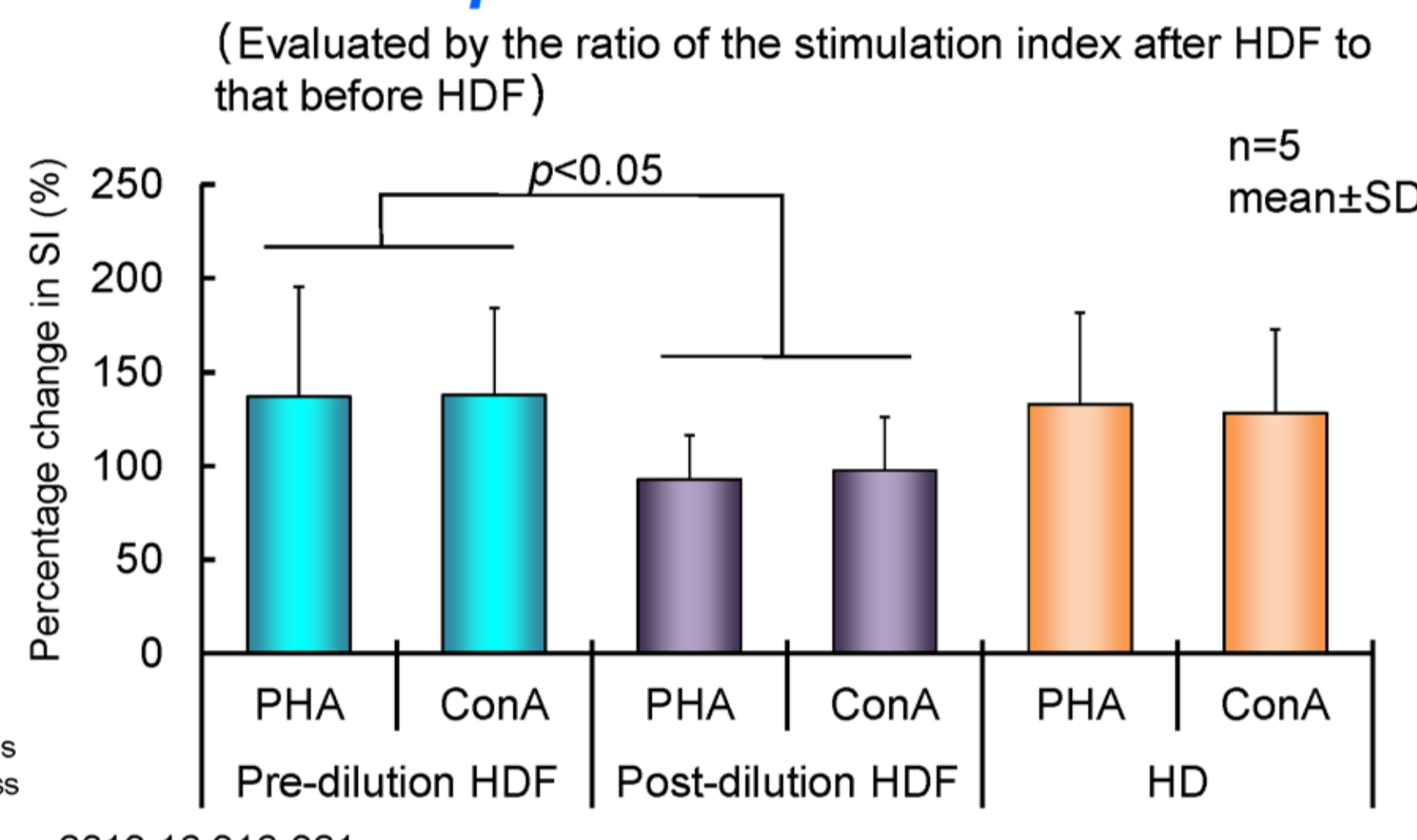
Our prior studies revealed that pre-dilution on-line hemodiafiltration (pre-HDF) was more preferred than the post-dilution (post-HDF) in terms of biocompatibility¹⁾. In pre-HDF, however, as the blood flow rate in hollow fibers increases, the shear stress rises, that could cause detrimental effects on the body. Alternatively, in post-HDF, since the filtration fraction is relatively lower, resulting the lower hemoconcentration, which may be better for avoiding any harmful effects. Herein, we have chosen cell surface markers on platelets and lymphocytes (CD62P and CD69), as well as IL-6, to re-evaluate which of pre- or post-HDF is more favorable for the body.



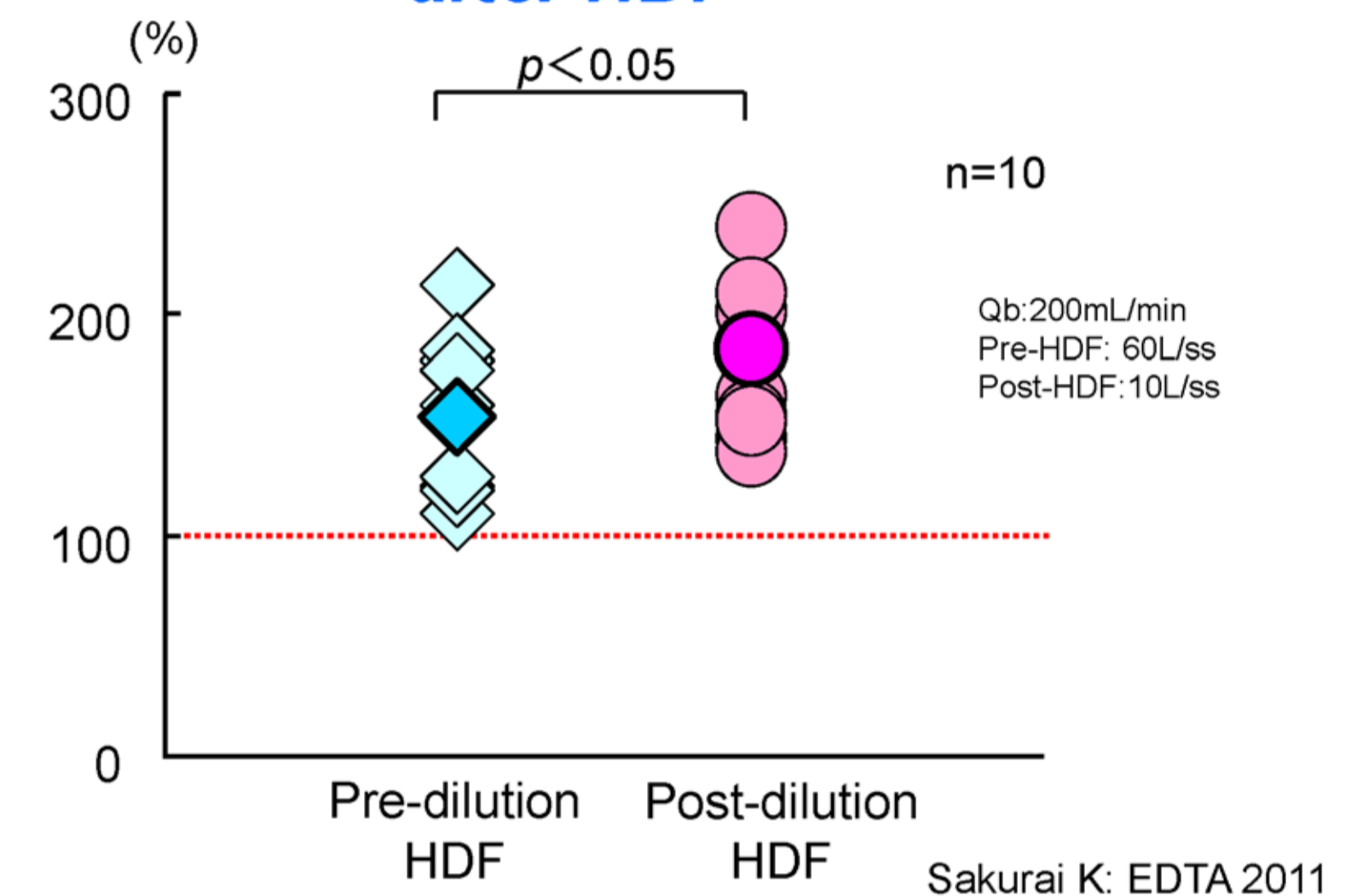
Serum IL-6 and ICAM-1 concentration



Lymphocyte blastoid transformation in response to PHA or ConA



PTX-3 concentration change after HDF



Methods

[Patients]

This study involved 8 stable patients undergoing HD or HDF at Hashimoto Clinic.

M/F: 6/2
 Age: 62.1 ± 11.0 yrs
 Dialysis vintage: 12.1 ± 8.6 yrs
 Dry weight: 61.2 ± 8.1 kg

[Treatment mode]

HDF was performed in the following 4 modes for investigation using MF-21S (PES membrane, NIPRO) as a hemodiafilter. Treatment time: 4 hours. Total dialysate flow rate: 600 mL/min

Mode-1: Pre-HDF, Qb 200 mL/min, Qs 175 mL/min (40 L/ss)
 Mode-2: Pre-HDF, Qb 300 mL/min, Qs 300 mL/min (70 L/ss)
 Mode-3: Pre-HDF, Qb 200 mL/min, Qs 22 mL/min (5 L/ss)
 Mode-4: Post-HDF, Qb 300 mL/min, Qs 70 mL/min (16 L/ss)

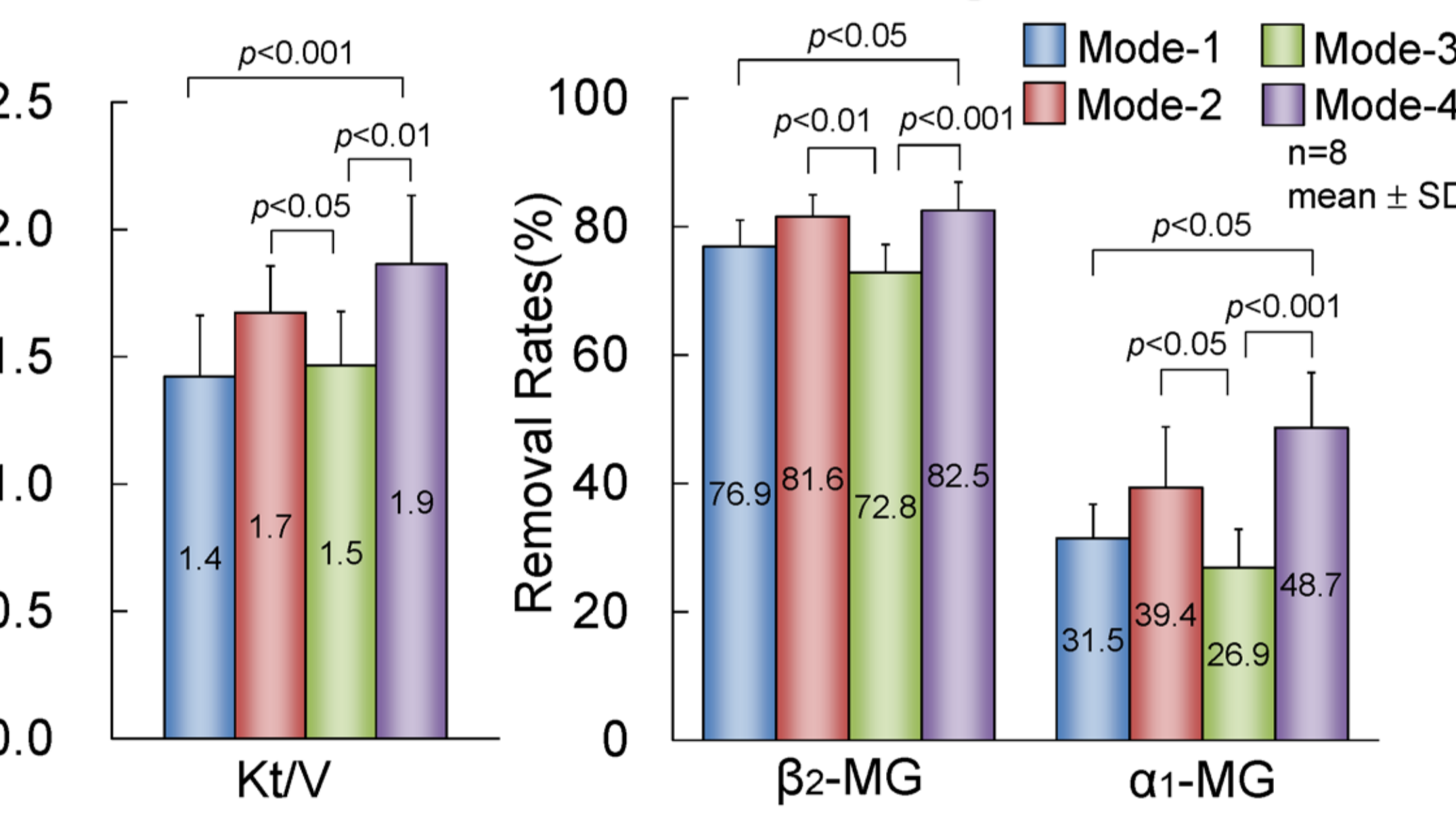
[Analysis]

- CD62P (Platelet): before, 30 min after starting & after HDF
- CD69 (Lymphocyte) : before & after HDF
- WBC, PLT: before, 30 min after starting & after HDF
- Highly sensitive IL-6: before & after HDF
- Solute removal performance: Kt/V for Urea
 Removal rate: β₂-microglobulin (β₂-MG, MW:11.8 kDa)
 α₁-microglobulin (α₁-MG, MW:33 kDa)

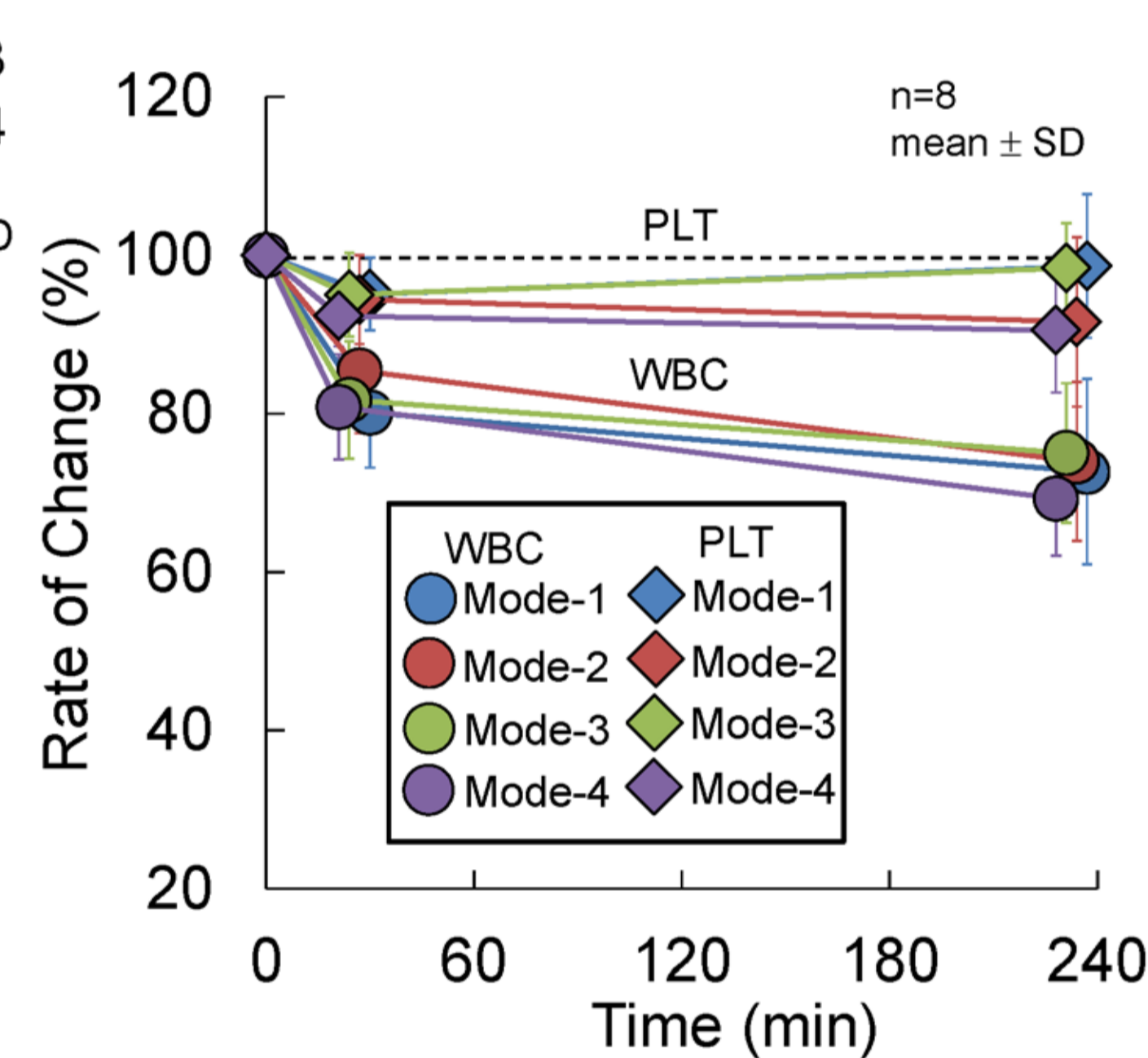
Cell surface markers were measured with BD FACS Calibur, and changes in positive rates for each marker were assessed. Statistical analyses were performed with the Friedman and paired t-tests.

Results

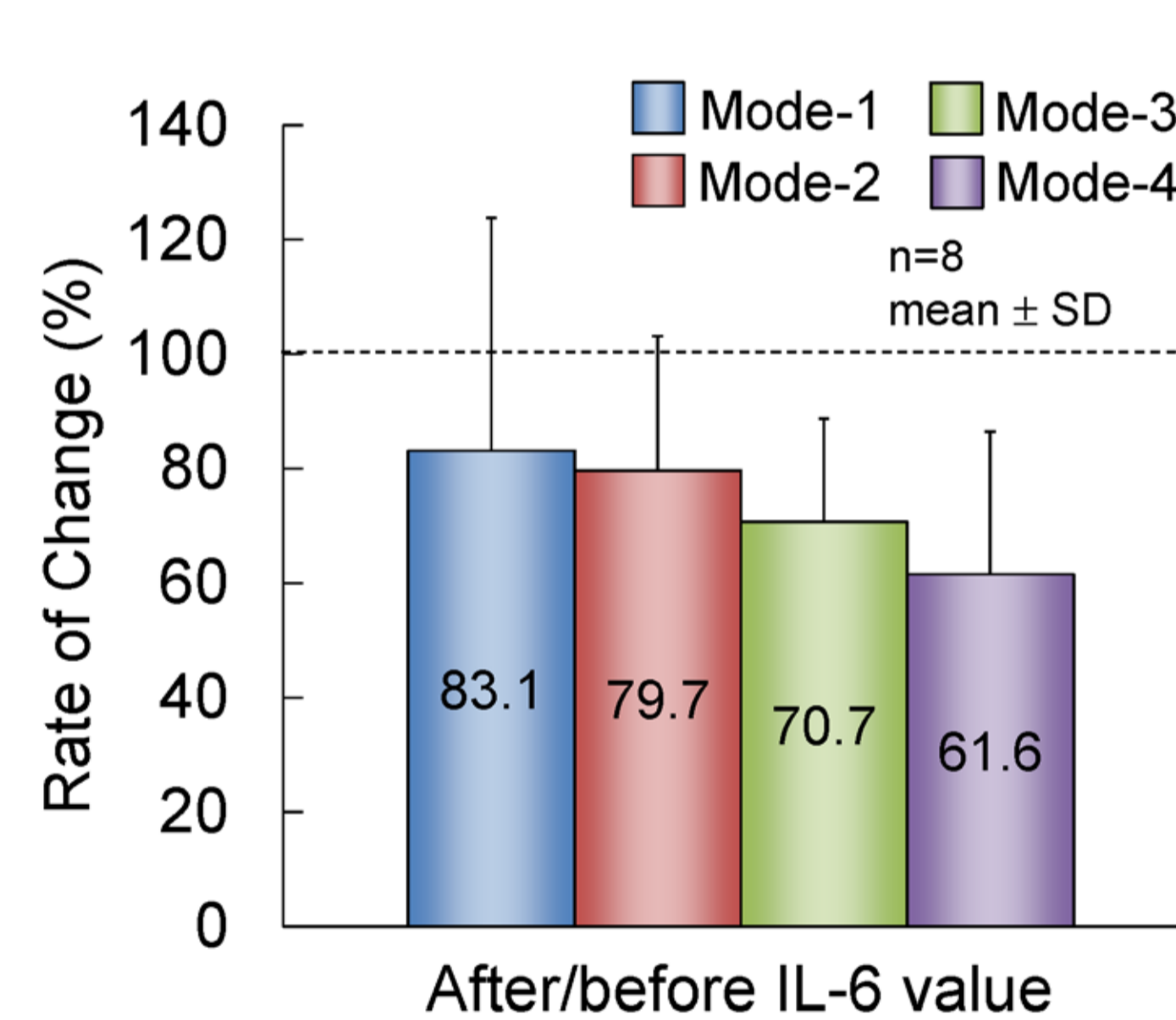
Solute removal performance



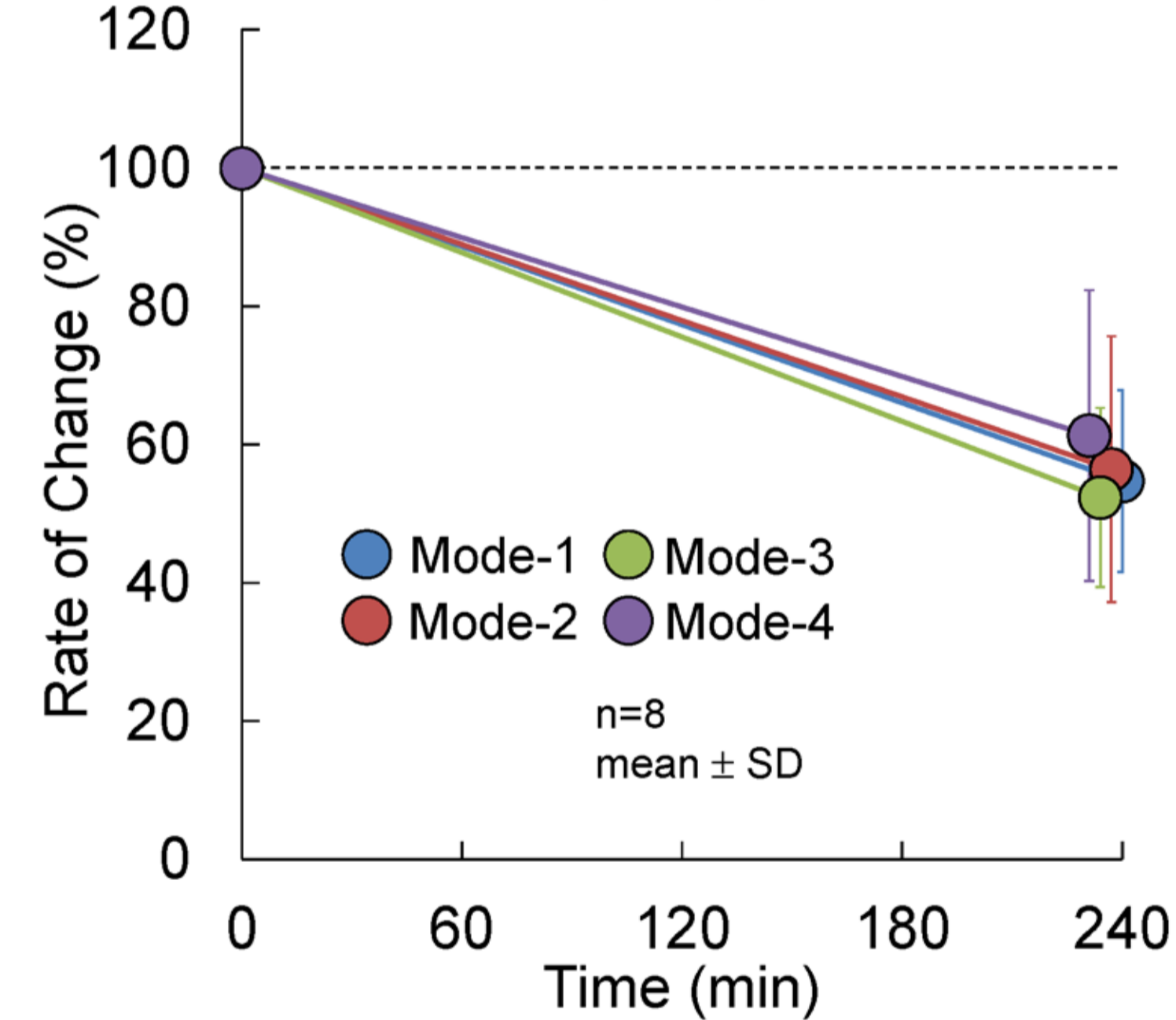
WBC & PLT



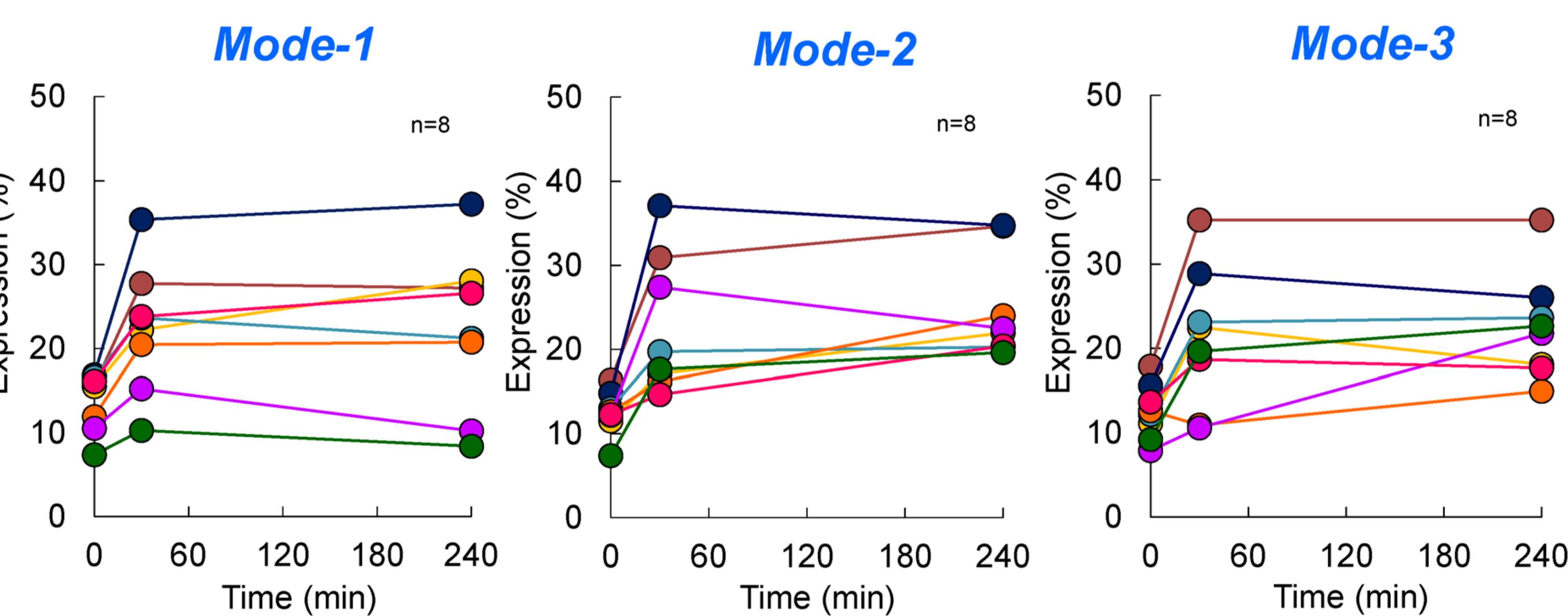
IL-6



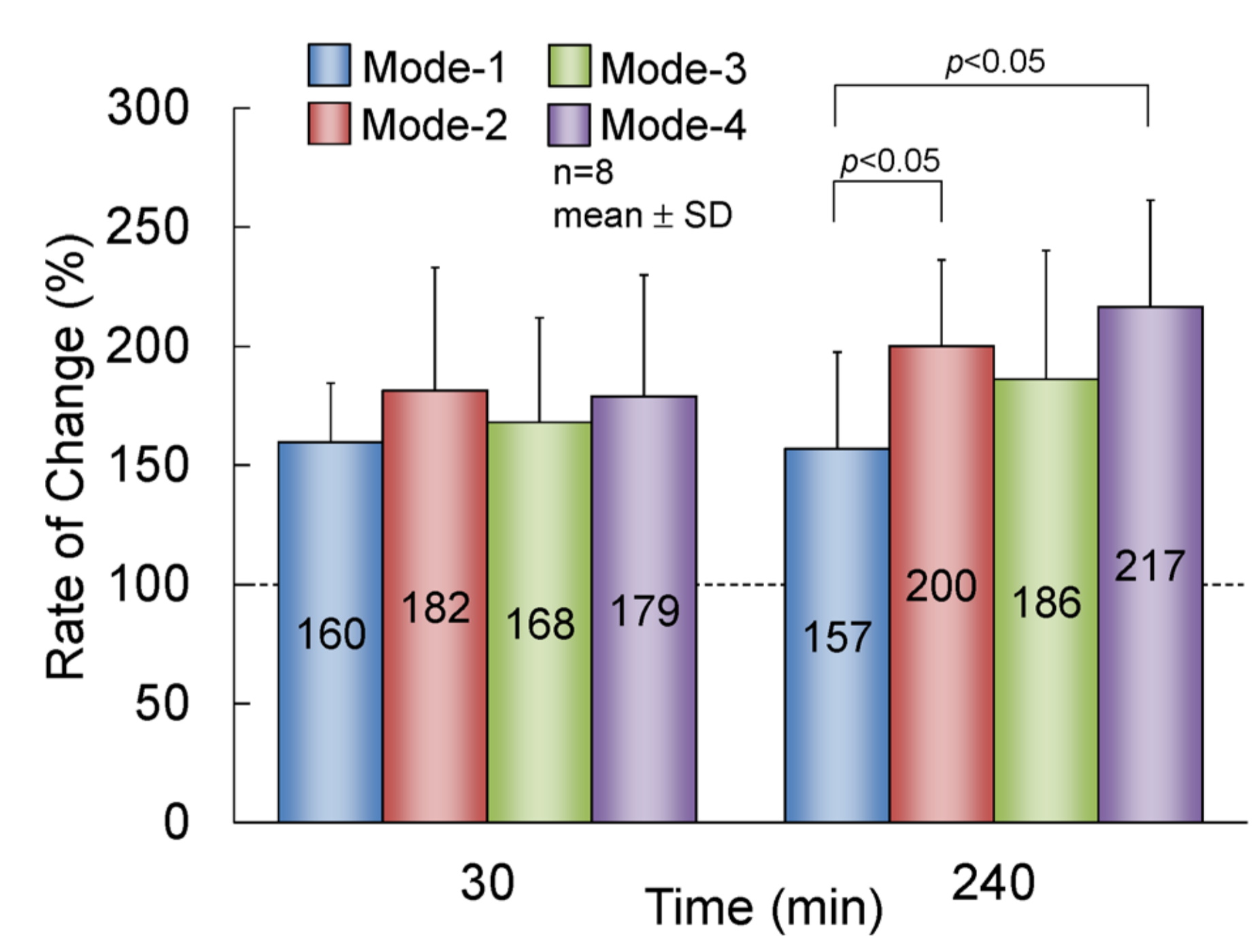
CD69



CD62P



CD62P



Discussion

CD62P is expressed on the cell surface when platelet is activated. CD62P expression rates were higher in post-HDF than in pre-HDF in this study. Moreover, Mode-2, with HDF performed at a high blood flow rate and a high replacement fluid flow rate, showed a significantly higher expression rate for CD62P than Mode-1. Thus, if the total blood flow rate inside the hollow fiber becomes too high even in pre-HDF, platelet function may be abnormally enhanced.

Our present results of CD69 and IL-6 indicate that HDF under these conditions may suppress systemic inflammation.

Conclusions

Pre-HDF lowers platelet activation more than post-HDF. However, clarification of the appropriate blood flow rate and replacement fluid volume requires further investigation.

Reference

1. Sakurai K, et al: Comparison of predilution and postdilution hemodiafiltration on neutrophils, lymphocytes and platelets. J Artif Organs.2013;16:316-21

