

Microparticle, neutrophil and platelet changes associated with hypobaric and hypoxic exposures

**Stephen R. Thom¹, Ming Yang¹, Veena B. Bhopale¹, Paul Sherman²,
Peter Kochunov³, Stephen McGuire^{2,4}**

**(1) Dept. of Emergency Medicine, University of Maryland School of Medicine,
Baltimore, MD**

**(2) U.S. Air Force School of Aerospace Medicine, Aerospace
Medicine Consultation Division, Wright-Patterson AFB, OH;**

**(3) Department of Psychiatry, University of Maryland School of Medicine,
Baltimore**

(4) Department of Neurology, Lackland AFB, TX

Research on altitude-induced decompression sickness (DCS) has been prompted because of an increased incidence of DCS in U-2 pilots.

This study investigated whether changes occur in circulating microparticles (MPs), 0.1 – 1.0 μm vesicles, and other blood elements in human volunteers exposed to simulated 25,000 feet altitude in a hypobaric chamber.

With IRB approval, blood samples in commercial fixative were obtained from human subjects ½ hour before, immediately following, 24 and 72 hours after simulated altitude exposure.

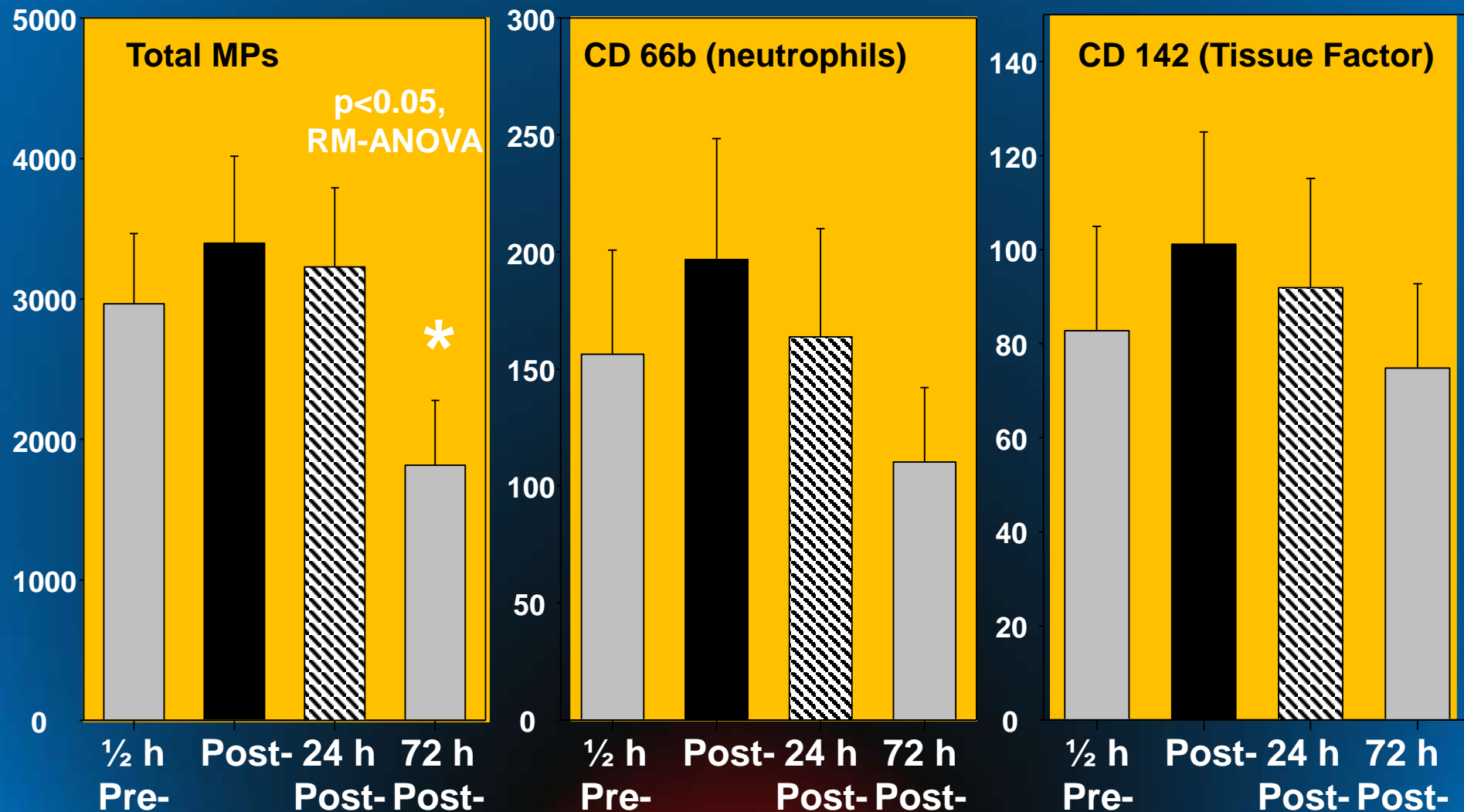
Subjects breathed oxygen through a face-mask while transiting to altitude. At altitude some subjects removed the mask to incur a hypoxic stress; others kept wearing the mask and so incurred decompression stress without hypoxia.

Blood samples were analyzed for MPs characteristics, neutrophil and platelet activation following published techniques. No individuals sustained DCS.

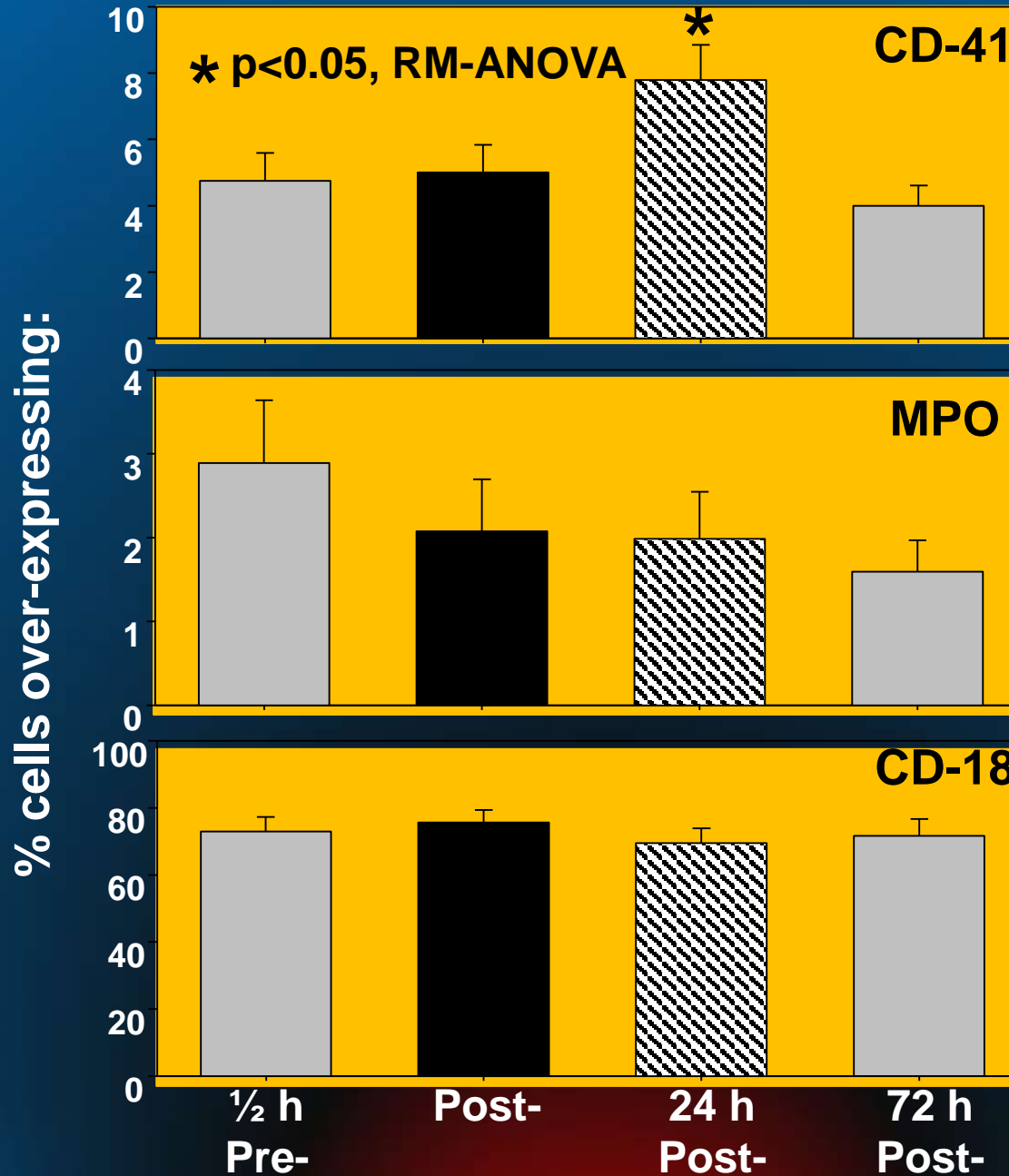
Total MPs, those expressing CD66 & CD142 (#/μl plasma)

Hypobaric/hypoxic (n=23)

½ hour O₂ pre-breathe, to 25,000 ft & take off O₂ mask until sx.



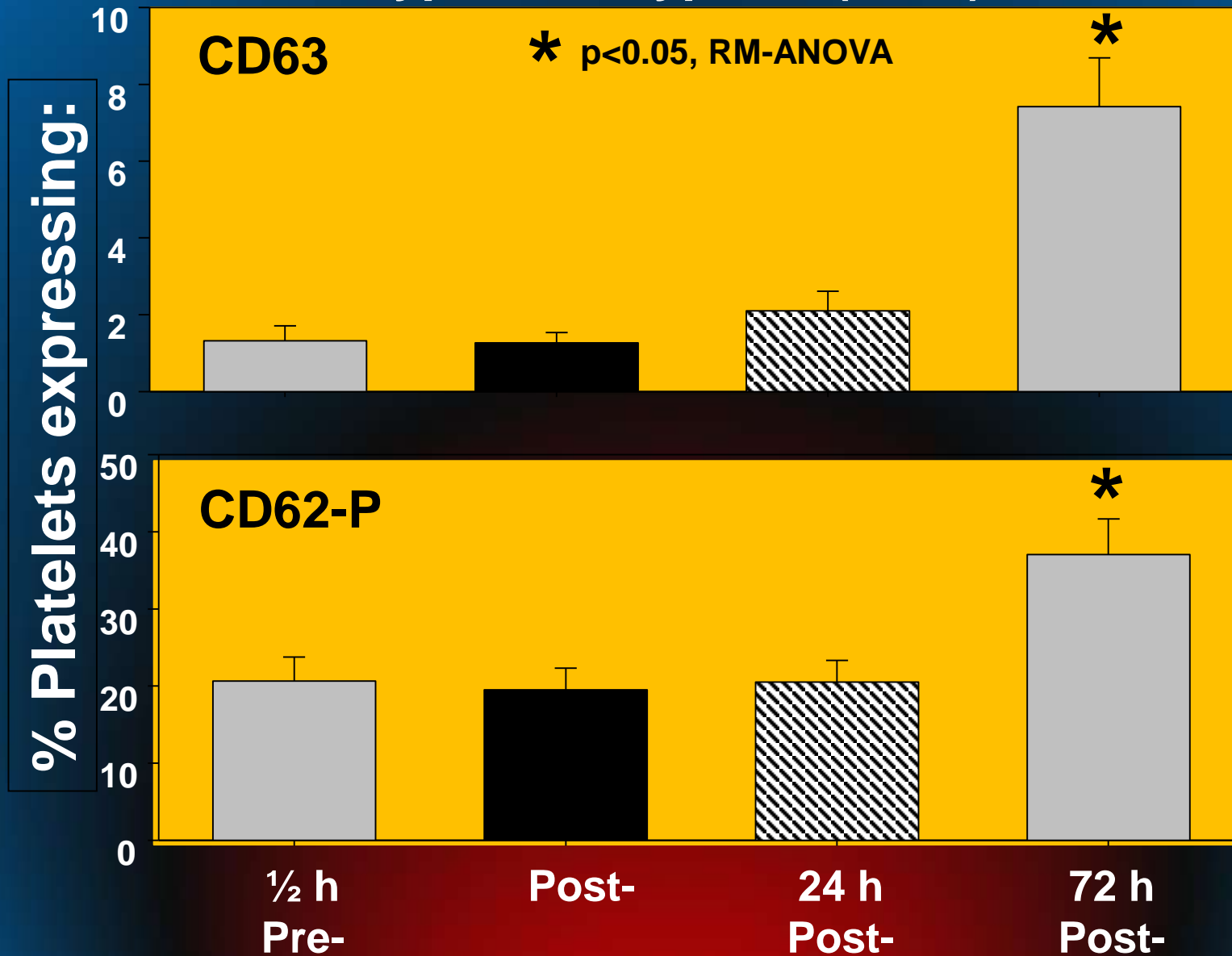
Neutrophil Activation Hypobaric/hypoxic (n=20)



**Platelet-PMN
interactions**



Platelet Activation Hypobaric/hypoxic (n=16)



These preliminary findings from an on-going investigation suggest there are mild alterations in MPs and blood elements due to hypobaric hypoxia.

Further work is required to validate changes, compare results against normal controls and individuals subjected only to hypobaric conditions.