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Subtype-specific dynamics and roles for chronic stress-induced mobilization of leukocytes

Ishikawa Yuka^{1,2}, Shiho Kitaoka¹, Taro Kato², Tomoyuki Furuyashiki¹

¹*Div. of Pharmacol., Grad. Sch. of Med., Kobe Univ.*, ²*Pharmacol. Res. Unit, Sumitomo Dainippon Pharma Co., Ltd.*

Clinical studies have suggested the association of inflammation with mental illnesses. Neutrophils and monocytes play a central role in inflammation, and have been shown to increase in the blood of depressive patients. Chronic stress in rodents induces mobilization of neutrophils and monocytes in a manner relevant to depression-related behaviors. However, the dynamics, mechanisms, and behavioral significance of respective leukocyte subtypes remain poorly unknown. Using repeated social defeat stress in mice, we have examined chronic stress-induced mobilization of leukocytes, mainly neutrophils and monocytes, and its relevance to concomitant behavioral changes. The stress induced the mobilization of both neutrophils and monocytes through adrenergic receptors, perhaps due to sympathetic activation. However, the neutrophil increase sustained after the stress, whereas monocytes increased relatively transiently. Antibody-mediated depletion of monocytes and neutrophils in combination, but not of neutrophils alone, attenuated anxiety-like behaviors induced by the stress. These findings suggest distinct dynamics and roles of neutrophils and monocytes for chronic stress-induced leukocyte mobilization.