Influence of social status on the morphology of the peripheral blood in rats

The majority of animals, including rats, during forming of herd, develop a social hierarchy – dominance and subordination. In addition to well known differences in behavioral and neuroendocrine reactivity between dominants and subordinates, there is growing evidence that social status may be a crucial factor also for the red and white blood cells responsiveness. The aim of the study was to verify these observations and to assess the individual differences in the social stress-induced changes in the morphology of the peripheral blood. Rats were placed in pairs in the standard laboratory cages and social status of each animal (domination or subordination) was assigned on the basis of their behavior during confrontation lasting 1 hour. The following behaviors were recorded in respect to their frequency and duration: aggressive (offensive) behavior including attack, bite, posture on-the-top as well as defensive behavior including retreat, freezing and posture on-the-back. The blood was taken from rats through cardiac puncture before social stress (resting level) and after the cessation of social interaction. The total numbers of leukocytes and erythrocytes as well as hematocrit and hemoglobin concentration were determined in each blood sample. Social stress led to a decrease in the leukocyte number in the peripheral blood in both groups of rats, however subordinates have a lower number of leukocytes than dominants. Red blood cells, as well as hematocrit and hemoglobin concentration increased after social stress. All these effects were more pronounced in dominant rats than subordinate ones. The obtained results show that dominant and subordinate rats differ in the response to the social stress as well as that dominants are characterized by more favorable changes of the morphology of the peripheral blood than subordinates.