The positive effect of paws Pets reduce the risk of stress-related disorders in city dwellers

Contact with pets reduces the risk of developing stress-related disorders in adult life in urban children. This is the conclusion of a study conducted by the Section for Molecular Psychosomatic Medicine at Ulm University Hospital together with other researchers from Germany and the USA. Living with animals is said to alleviate inflammatory stress reactions. The work has been published under the title "Pawsitive impact" in the journal Brain, Behaviour and Immunity.

Many cities offer lucrative jobs and numerous leisure opportunities, but are also characterised by heavy traffic, long travel times, little green space and little recreation. Various stress-related physical and mental disorders occur more frequently in city dwellers than in the countryside. An overreactive immune system and chronic, low-grade inflammation are not only associated with many of these stress-related disorders, but also play a crucial role in the development of inflammatory immunoreactive processes, according to preclinical studies. Another common feature of many stress-associated diseases is impaired intestinal barrier function, which favours the entry of intestinal bacteria into the body. "Together, these two factors can then cause an excessively reinforced activation of our evolutionarily conserved inflammatory stress response," says Dr Dominik Langgartner, one of the lead authors of the study from the Section for Molecular Psychosomatics at the Clinic for Psychosomatic Medicine and Psychotherapy at Ulm University Hospital. "It was precisely this interaction that we wanted to investigate in more detail for men who grew up with and without pets in an urban environment."

The researchers' study follows on from a study from 2018, which showed that rural dwellers with close contact to farm animals cope much better immunologically with stressful situations than city dwellers who grew up without pets (Böbel et al., PNAS, 2018). "However, our study at the time left the question unanswered whether this clear difference in stress-associated immunoreactivity was due to the 'urban versus rural' factor or to the 'regular versus no animal contact' factor," explains Section Head Professor Stefan Reber, who coordinated the previous study as well as the current one. "Particularly interesting in this context are studies that suggest that regular contact with animals and the associated increased exposure to environmental microorganisms, rather than the rural environment itself, appears to play an important role in the prevention of allergies and autoimmune diseases." The follow-up study should now answer whether regular animal contact can also mitigate the stress-associated immune activation of city dwellers and thus prevent stress-associated chronic, low-grade inflammation in the long term.

For the new study, a total of 40 healthy male participants between the ages of 18 and 40 were recruited who grew up in a city with a population of more than 40,000 and either had no pets until the age of 15 or had lived with a dog or cat for at least five years. The participants were exposed to standardised psychosocial stress according to the "Trier Social Stress Test" (TSST). Mental and physical health status, early life stress, current contact with animals and subjective stress were recorded using a questionnaire. Blood and saliva samples were taken before and after the test to determine blood cell composition, inflammatory parameters, intestinal barrier markers, the composition of the salivary microbiome, stress hormone levels and immunoregulatory markers, among other things. In addition, heart rate and heart rate variability were continuously recorded before, during and after the TSST. The stress test led to a faster mobilisation of neutrophil granulocytes in particular, i.e. specialised white blood cells that serve the immune defence, in participants who grew up without pets compared to test subjects with animal contact. This was accompanied by an increased pro-inflammatory systemic stress response.

"We can show that in healthy urban males who have grown up without pets, their immune system has less immunoregulatory capacity and the intestinal barrier function is impaired. Under normal conditions, this has no effect at first, but the increased immune cell mobilisation under stress can lead to an exaggerated acute inflammatory reaction under these conditions," explains Katja Weimer, the second lead author of the study from the Clinic for Psychosomatic Medicine and Psychotherapy in Ulm.

Overall, contact with pets appears to reduce the risk of developing stress-related disorders later in life. On the one hand, it positively influences both immunoregulatory capacity and barrier function, thus preventing excessive immune activation in response to acute stress and a chronic low-grade inflammatory reaction in response to repeated stressors. The researchers from Ulm University Medicine, the University of Colorado, USA, the University of Erlangen-Nuremberg, Boehringer Ingelheim Pharma from Biberach and the University of Heidelberg hope that the results could contribute to the development of new

immunoregulatory approaches to promote stress resilience and thus mitigate or prevent the steadily increasing impairment of mental health in recent decades, especially in urban areas.

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