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Low energy availability and athlete immune health

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In surveys of factors that limit an elite athlete's availability to train and compete, infections rank second only to injury. Sickness absence from training is clearly incompatible with success in elite sport and so identifying the leading causes of infection and appropriate mitigation strategies remains a priority for sports scientists and practitioners working with elite athletes. Empirical evidence indicates that the aetiology of infection in elite athletes is multifactorial. Prominent infection risk factors are broadly similar to the wider population and include wintertime and foreign travel, when exposure to pathogens increases, and factors that influence neuro-endocrine-immune interactions including psychological stress, anxiety, depression, poor sleep and recovery status.

There is currently no direct evidence showing that the dietary strategies of elite athletes clinically suppress immunity. Nutrient availability influences immunity because macronutrients are involved in immune cell metabolism and protein synthesis and micronutrients in antioxidant defences. Recent reports of raised respiratory infection risk in elite athletes presenting with Relative Energy Deficiency in Sport symptoms, and associated claims of 'immunological dysfunction', place low energy availability (LEA) firmly under the spotlight as a potential risk factor for infection. 'Immunological dysfunction' has not been demonstrated in athletes with LEA but is clearly demonstrated in severely malnourished children with Kwashiorkor who suffer lymphoid atrophy and increased infections in the advanced stages of the disease. Protein deficiency is considered largely responsible for clinical immune suppression in severe malnutrition and starvation. However, as studies in female athletes with LEA show no evidence of malnutrition (protein intake is typically adequate) likely there are other extra-nutritional explanations for the observed association between LEA and respiratory infection incidence. For example, it is conceivable that poor mental health, which is highly co-morbid with LEA in female athletes, likely accounts for reports of raised respiratory infection incidence in elite athletes with LEA. Accordingly, one study in athletes with LEA reported that anxiety, stress, depression and overall recovery state explained most of the variance in illness symptoms.

This presentation will critically discuss the available research on LEA and athlete immune health, highlighting important directions and methodological considerations for continued research in this space.