

Infographic. Relative energy deficiency in sport: an infographic guide

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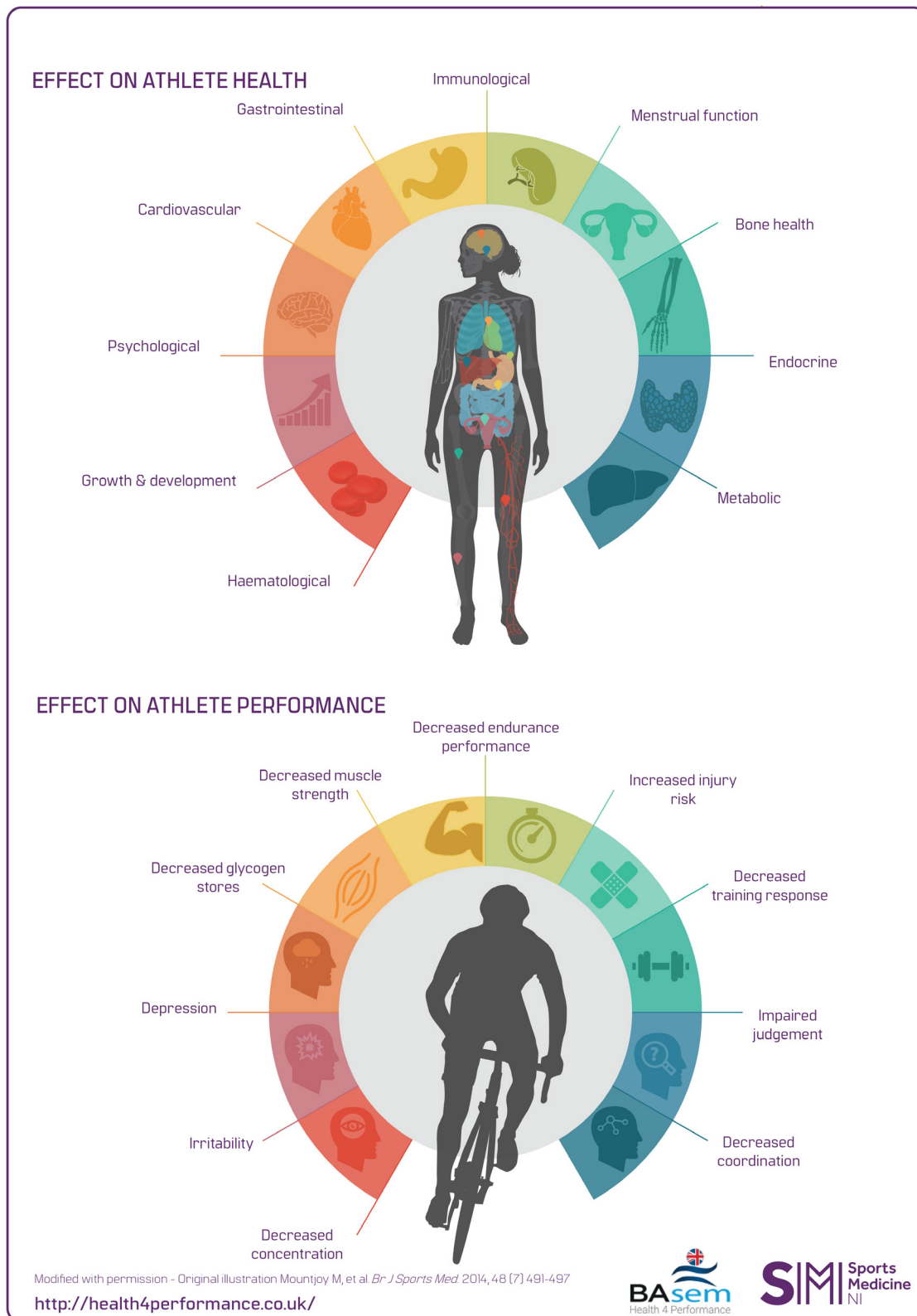


Figure 1 Relative energy deficiency in sport: effects on health and performance.

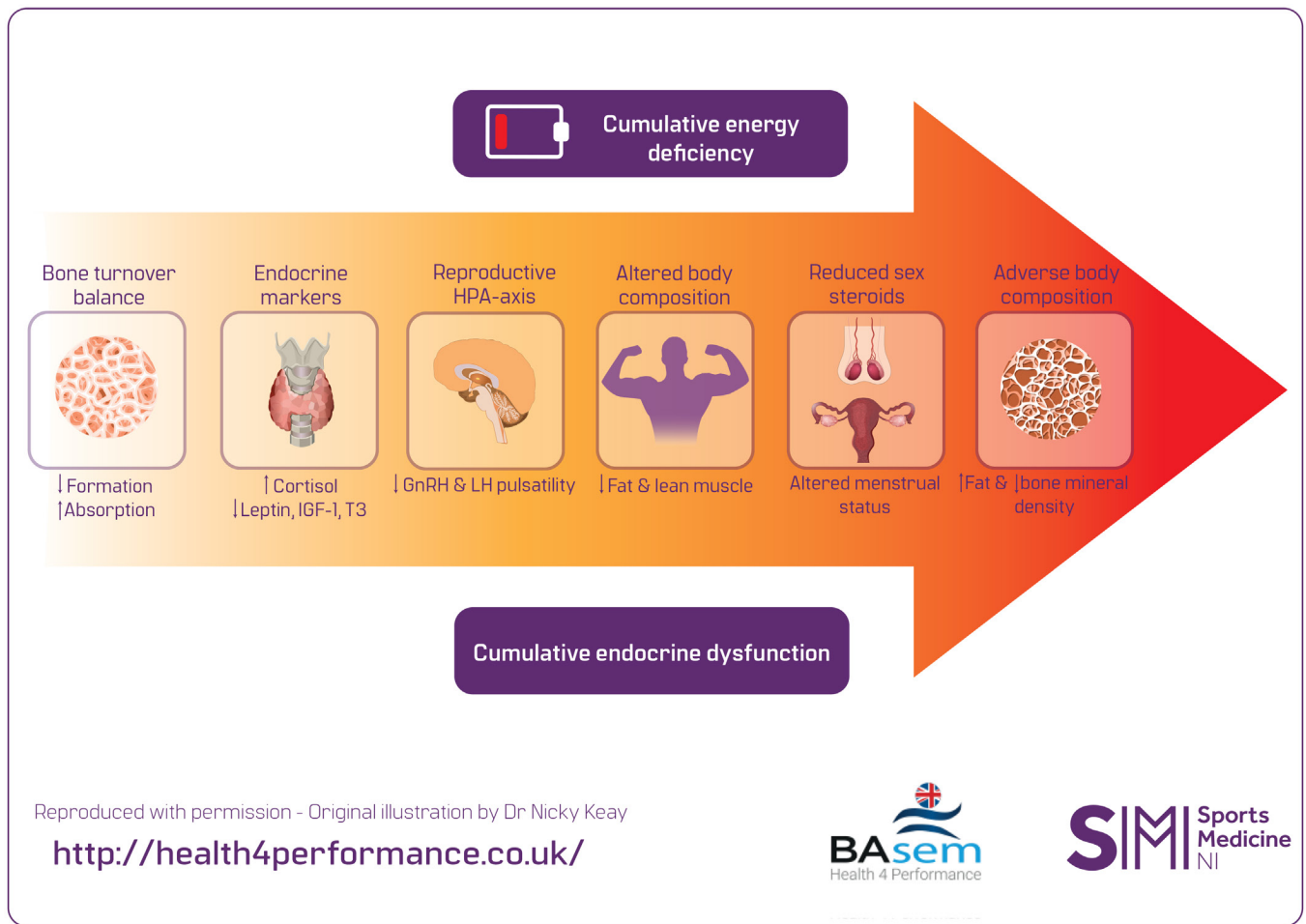


Figure 2 Cumulative energy deficit and energy availability.

Relative energy deficiency in sport (RED-S)¹ is a clinical syndrome encompassing adverse health and performance (figure 1) consequences of low energy availability (LEA)² in male³ and female exercisers of all ages and all levels from recreational to elite. LEA is a situation where energy intake is insufficient to cover the combined energy demands of training and baseline physiological processes to maintain health. LEA can arise unintentionally or intentionally (figure 2). Unintentional LEA results from increased training load, which is not matched by an increased energy intake. Intentional LEA is more likely to arise in sports where low body weight confers a performance or aesthetic advantage, for example, gravitational sports including cycling, ski-jumping, climbing; weight-category sports including boxing and judged artistic sports including gymnastics, aquatic disciplines. RED-S is also a risk in dancers of all genres, but in particular ballet.⁴ Intentional LEA can be due to spectrum of disordered eating to eating disorders.

The body responds to LEA by downregulating fundamental physiological processes. This ‘energy saving mode’ is of particular clinical significance in the endocrine network system (figure 3). For women, LEA can manifest itself as menstrual disruption, in men this corresponds to low testosterone. The net effects of dysfunctional endocrine feedback loops are adverse effects on health and dampened response to training stimuli. For example, endocrine dysfunction manifests as suboptimal bone health with increased risk of bone stress injuries. Increased duration of LEA accrues cumulative effects on endocrine networks and hence health and performance (figure 2).

Although the exerciser may initially improve athletic performance with short-term LEA, long-term LEA will lead to deterioration in health and performance. Therefore, early identification of those at risk of LEA is essential in preventing the clinical consequences of RED-S. This is the purpose of the BASEM website Health4Performance⁵ to raise awareness

of RED-S among athletes/dancers, coaches, parents, friends and healthcare professionals to encourage a multidisciplinary team approach to identifying and supporting those at risk of RED-S.

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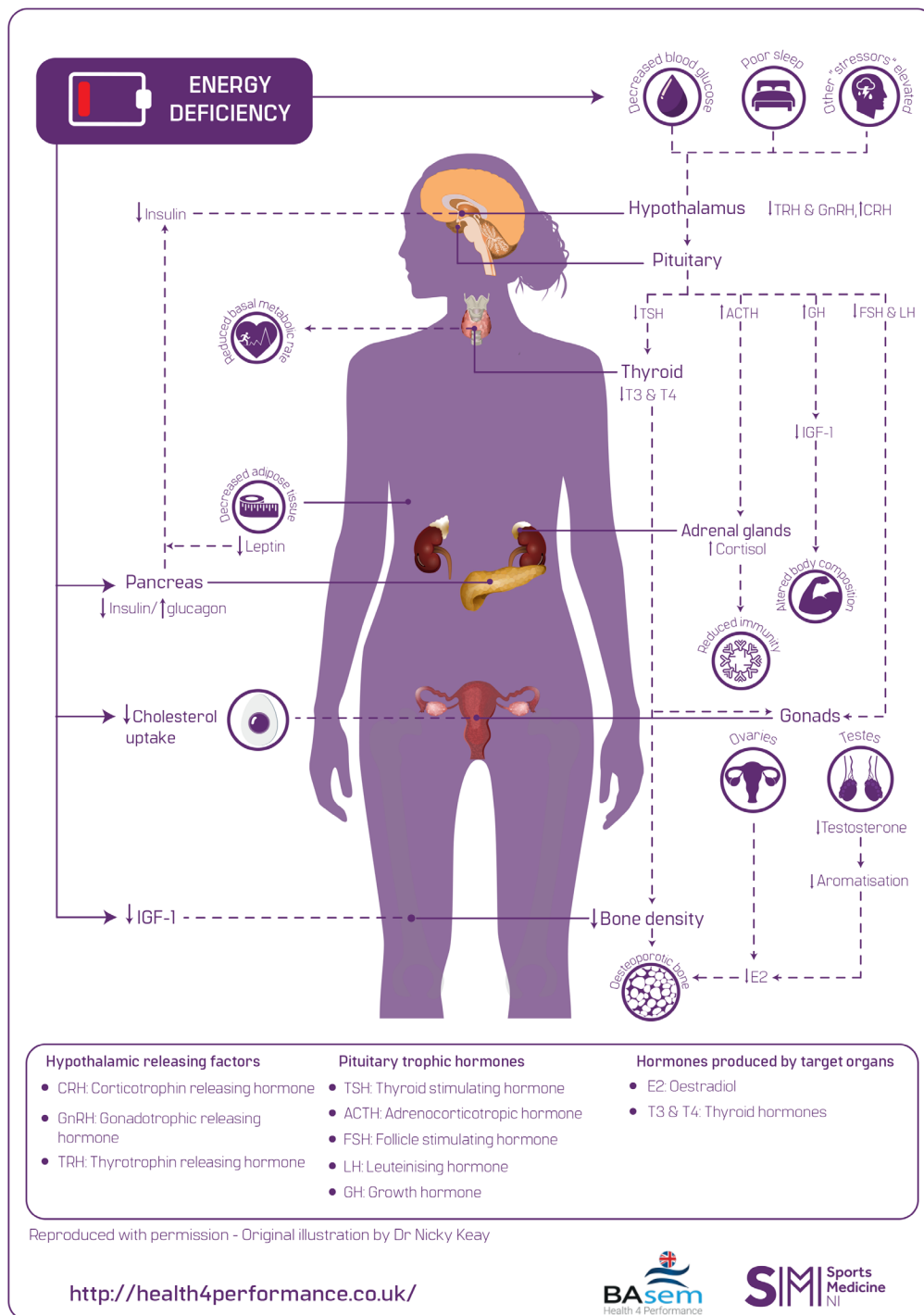


Figure 3 Relative energy deficiency in sport: endocrine effects.

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