

Is it the creatine or the anabolic androgenic steroids? Need for assessing the steroids role in testicular cancer

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Sir,

We have read with considerable interest the case-control study by Li *et al.* (2015), in which muscle building supplement (MBS) use was found as an associated factor with testicular germ cell cancer. It is important to remark that the association remained statistically significant even after controlling for important potential confounders. However, we consider that there is one non-assessed variable that might be relevant in the multi-causal model for testicular cancer.

Previous research shows that the frequency of anabolic androgenic steroid (AAS) use within practitioners of recreational physical activity can be as high as 30 (Abrahin *et al.*, 2014) to 50% (Dodge *et al.*, 2011). Therefore, there is high probability of concomitant AAS and MBS use. In addition, AASs have been associated with the development of some types of cancer. Nandrolone and stanozolol, two of the most used AASs, have proven to enhance Leydig cell proliferation, increasing the risk of tumour development in rats (Chimento *et al.*, 2012). There is also suggestive evidence that involves AAS in Leydig cell tumour growth in humans (Belli *et al.*, 2013). In this scenario, AAS could be playing an undetected role in malignancy development instead of or in conjunction with MBS.

Moreover, two recently published articles detected the presence of AAS in products marketed as dietary supplements (Abbate *et al.*, 2014; Odoardi *et al.*, 2015). Thus, the MBS consumed by Li's study participants could have been contaminated with AAS. This highly probable mix of substances does not allow us to convincingly blame one specific compound.

In summary, Li's results provide valuable information suggestive of MBS use as a potential risk factor for testicular cancer. However, future

research considering the potential AAS effect should be carried out in order to clarify the real influence of this substance.

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