DOES AN IRONMAN TRIATHLON INDUCE DNA DAMAGE?
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Background: Regular moderate exercise and its beneficial influence on health have already been well-investigated. However, information on high volume exercise which might lead to increased oxidative stress and DNA damage is still very limited. Currently there are no data available dealing with the influence of an Ironman triathlon or a similar load with comparable duration on genomic stability. Therefore, the purpose of the present study was to investigate the effect of an Ironman triathlon race (3.8 km swim, 180 km cycle, 42 km run) on genomic stability and a possible DNA damage.

Materials and methods: The sister chromatid-exchange (SCE) assay is a cytogenic biomarker, which can be influenced by various factors such as oxidative stress that occurs during extreme endurance exercise. Free radicals can impair cell functions and processes during mitosis which can lead to increased SCEs frequencies.

Within this study SCEs and high frequency cells (HFCs) were measured in peripheral blood lymphocytes of nine well trained male triathletes (age 38 ± 6 years; VO\textsubscript{2} peak 55.59 ± 2.97 ml/kg/min; height 179.1 ± 4.19 cm; weight 76.3 ± 4.27 kg). Blood samples were collected 48 h before and 24 h post race.

Results: The mean SCE frequency in the Ironman triathletes 2 days before the race was 6.55 ± 2.71 per metaphase, which was significantly higher than post race (5.69 ± 2.60 SCEs per metaphase, p < 0.05). Additionally the mean of HFCs significantly decreased from 11.06 ± 2.66 per metaphase before the race to 9.42 ± 3.74 per metaphase post race (p < 0.05). Regarding the training levels a significant negative correlation between the relative SCE changes before and after the triathlon was observed for the cycling training per week (km) (r = -0.86; p < 0.01), the running training per week (km) (r = -0.9; p < 0.05) as well as the weekly net exercise training time (h) (r = -0.89; p < 0.05). The relative changes of HFCs correlated significantly with the cycling training per week (km) (r = -0.79; p < 0.05).

Conclusion: The significant decrease of SCEs and HFCs after the Ironman triathlon race provides an indication of endogenous repair mechanisms or counterregulations, which seem to prevent DNA damages probably through releasing antioxidants.

Keywords: Genetics, Triathlon, Lymphocyte