TO WHAT EXTENT AGROCHEMICALS EXPOURE AFFECTS MALE GONADS?

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Introduction

Agriculture practices are recognized sources of pollutants and, according to Horrigan et al. (2012), the most significant anthropogenic activities that greatly affect both environment and human health. Health effects of agrochemicals exposure on male reproduction are an issue of considerable concern in environmental, occupational and reproductive toxicology (Perry, 2008; Mehrpour et al., 2014), as the testicle is considered one of the most vulnerable organs to agrochemicals (Oliva et al., 2001). As in Portugal, and in many other countries around the world, agricultural activities are carried out by men, it is important to evaluate the effects of exposure to agrochemicals on male gonads. Thus, the main objective of this study was to clarify the link between different agricultural practices and male fertility.

Methods

The study was conducted in S. Miguel Island (Azores, Portugal), in farms located in the same geological complex, ensuring the same bedrock and pedological conditions. The selected study sites correspond to representative farms subjected to different agricultural practices (conventional and organic); a forest complex, ensuring the same bedrock and pedological conditions. The selected study sites correspond to representative farms subjected to different agricultural practices (conventional and organic); a forest complex, ensuring the same bedrock and pedological conditions. The selected study sites correspond to representative farms subjected to different agricultural practices (conventional and organic); a forest complex, ensuring the same bedrock and pedological conditions. The selected study sites correspond to representative farms subjected to different agricultural practices (conventional and organic); a forest complex, ensuring the same bedrock and pedological conditions.

Results

Results showed that mice living in farms where conventional agricultural practices are common have a tendency to bioaccumulate greater Pb hepatic loads, while mice exposed to organic agricultural practices tend to bioaccumulate greater Cd loads. Mice chronically exposed to conventional farming environments showed severe alterations in the seminiferous tubules: disorganization of the germinal epithelium, frequent detachment of spermatogonia from the basement membrane, macrovacuolization, reduction of spermatozoa, and a higher number of apoptotic DNA-fragmented cells mainly occurring in spermatogonia and spermatocytes.

Conclusion

The considered testicular damage biomarkers indicated the suppression of testicular function that ultimately may lead to male fertility impairment. These results also demonstrate that M. musculus is a suitable bioindicator for male fertility biomonitoring in farming environments, where collected information can be useful for a weight-of-evidence approach in risk assessment decisions.
References


