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POSSIBLE ROUTES OF ANIMAL EXPOSURE TO CADMIUM AND CADMIUM COMPOUNDS AND INDUCED EFFECTS: A REVIEW

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Background and Aims

The complexity of animal exposure to cadmium and cadmium compounds is of concern for humans due to multiple reasons, leading to different outcomes. To date, the general veterinary approach to such a complex issue divides animals into four major categories, in agreement with the way they come into contact with humans: farm animals, involved in the early phases of food production chains; wild fauna, particularly hit after ecological disasters or existing in the nearby of intensely industrialized areas; companion animals which share daily life and habits with owners; laboratory animals, observed in experimental trials to develop our knowledge. As a consequence, they are necessarily involved into environmental conditions and lifestyle, both as potential routes of exposure by animal products consumption, and as animal models to explain etiology, pathologic pathways, clinical outcomes. Literature about cadmium and cadmium compounds in animals reports several studies on acute and chronic exposures, via of absorption, target organs, lethal doses (LD(50)), toxicity, teratogenicity and carcinogenicity. Due to different roles, anatomo-physiological diversity and dietary habits of farm, wild, companion and laboratory animals, latest update about possible routes of exposure to cadmium and cadmium compounds and induced effects and have been systematically reviewed.

Methods

A retrospective analysis about cadmium and cadmium compounds teratogenicity, toxicity and carcinogenicity was carried out on literature basis, up to date, reviewed according to animal species, routes of exposure, acute and chronic response to different dosages via gastrointestinal or inhalatory uptake, target organs and apparatus. Some recent updates from experimental trials were also comparatively considered.

Results

The comparative review on cadmium-induced effects allowed to identify the genetic-type dependence to cadmium storage in organs and consequent excretion (urinary or fecal excretion). Emblematic results are reported about intraspecific differences in the aptitude to store cadmium in the liver. Carcinogenicity of cadmium and cadmium compounds appeared on the whole to confirm the involvement of different organs

Conclusions

A comparative animal-human approach to a better evaluation on routes of exposure to cadmium and cadmium compounds appears to be a valid tool both to investigate on bio-pathological pathways and differentially plan strategies to biological diversity