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Altered antioxidant profile and carbohydrate metabolism in canine mammary tumors

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Mammary tumors are the most common and prevalent type of neoplasms in canine species. Reactive Oxygen Species (ROS) are mainly involved in DNA damage and adduct formation which may lead to mutations in tumor suppressor genes and carcinogenesis. Transformed cells further counteract the accumulation of ROS by up regulating the antioxidant system. The aerobic pathways will be hindered and metabolic pathways are altered to its advantage to survive and proliferate under unique tumor micro environment. Cell metabolism is shifted towards increased glycolysis by the increased expression of glycolytic enzymes, glucose transporters and inhibitors of mitochondrial metabolism. Even though the cancer induced metabolic alterations are well established, the clinical data describing the metabolic profiles of animal tumors is not available. Hence our present investigation was carried out with the aim of studying the changes in carbohydrate metabolism along with antioxidant profile in canine mammary tumors. More than two fold increase in TBARS and threefold increase in Glutathione levels were observed in neoplastic tissues. In tumor tissues GST, GPx and Catalase activities were found to be reduced compared to controls. Hexose content of tumor mass was found to be increased (175%). Hexokinase activity, a key enzyme in glycolysis was found to be increased whereas in gluconeogenesis the activities of Glucose-6-phosphatase and Fructose -1, 6-bisphosphatase were reduced in tumor mass compared to control. Glucose-6-phosphate dehydrogenase activity, an enzyme of HMP pathway was decreased in tumor tissues. Finally it was revealed that carbohydrate metabolism is altered (Glycolysis, Gluconeogenesis & HMP pathway) along with increased lipid peroxidation in canine mammary tumors.

Biography

K Jayasri has completed her MVSc from Sri Venkateswara Veterinary University in 2006. She has worked as VAS for 8 years in the Department of Animal Husbandry and she is currently working as an Assistant Professor in the Sri Venkateswara Veterinary University.

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