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A basic study on the possible application of differentiation therapy for feline mammary carcinoma

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Most feline mammary gland tumors are histopathologically classified as adenocarcinomas, however these tumors occur commonly in cats. Alternative or adjunct therapies are often necessary since an effective therapy for these tumors has not yet been well established. Recently, differentiation therapy, an alternative and/or adjunct form of therapy for many human neoplastic diseases, has gained considerable attention in the treatment of cancer. Differentiation therapy makes use of agents that promote and take advantage of the property of transformed cells to undergo normal differentiation which results in the suppression of growth and reduction of the malignant properties which characterize the cancer.

The purpose of this study was to examine the possible application of differentiation therapy for the treatment of the undifferentiated and malignant feline mammary carcinoma. Three differentiation inducing agents: all-trans retinoic acid (ATRA); 9-cis retinoic acid (9-cis RA); and 22-oxa-calcitriol (OCT), a synthetic analog of the biologically active vitamin D₃, were used for the study.

These drugs were used to examine their efficacy to inhibit the growth and induce cell differentiation of four types of mammary carcinoma cells in vitro, the FRM, NAC, YMA and YMC cells which were isolated from feline spontaneous mammary gland tumors.

ATRA and 9-cis RA significantly inhibited the cell growth, promoted the morphological differentiation and induced apoptosis of the FRM and NAC cells. However, OCT showed only a slight inhibitory effect on the cell growth of YMC cells.

From the results, it is suggested that the inhibition of the cell growth of FRM and NAC tumor cells was mediated by the apoptotic and differentiation inducing properties of ATRA and 9-cis RA. These results also indicate that variations are present with regards to the sensitivity of feline mammary carcinoma cells for various differentiation inducers to inhibit cell growth and induce their differentiation. Further and extensive clinical application of these drugs are therefore warranted in order to establish their effectivity and usefulness in the differentiation therapy of feline mammary carcinoma in cats.