Effect of polarised light on the morphology of spontaneous tumours in dogs through extracorporeal exposure of their blood

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SINCE 1948 in vitro UV irradiation of blood followed by re-infusion has been used in clinical practice for the stimulation of regenerative processes in various pathological cases (Knott,1948). Light (UV, visible or infrated) can provoke the release of some biological mediators (cytokines) from the immune competent cells and in this way can stimulate the natural protection of the organism (Fenyo, 1984; Kubasova and others, 1995) as well as it can stimulate the IL-6 production in human B lymphoma cell line (Fenyo and others, 2001). In vitro exposure of the spleens of tumour-bearing mice caused the appearance of factors in their serum inhibiting the incorporation of ^{3}H-thymidin into the tumour cells obtained from non-exposed animals in vitro (Kubasova and others, 1995).

The aim of the present study was to answer the question, whether the extracorporeal exposure of blood to polarised light leads to changes in the structure of spontaneous tumours in dogs.

Six-mixed breed dogs of 2 to 3 years old and ten ones of 5 to 12 years old with spontaneous tumours were treated (Table 1).

Before starting the treatment, biopsy was taken from the tumour tissue for determination of the type of the tumour. After finishing the treatment period all the tumours were removed by operation for histological examination. In the case of two dogs (No 5 and 9) a detailed autopsy was done.

Approximately 1.4 to 1.9 ml of blood per body weight was withdrawn from the vena jugularis into heparinized plastic syringe (50 ml) in the morning at each working day during a 3-week period of time. Special glass cuvette was connected with an infusion set. Before puncturing the vena cephalic antebrachii the sterile glass cuvette was fulfilled with normal saline (0.9 %) without air bubbles. About 15 ml of blood could be injected into the cuvette and was exposed to polarised light (Bioptron AG, Switzerland)

of 4 J/cm^2 from a 10 cm distance measured between the polaroid filter and the special glass cuvette for 2 minutes. The volume of the cuvette was 15 ml therefore in those cases when more blood had to be exposed to polarised light the whole procedure was repeated. The inner volume of the cuvette was 13 cm X 8 cm X 0.02 cm.

No harmful effect of the treatment was found in the healthy control group (n=6) neither in the group suffering from spontaneous tumour (n=10).

According to our observations the dogs with spontaneous tumours became more active and vivid after the first three days of the treatment series in comparison with the initial status. Before starting the treatment period the tumours in 2 dogs (No. 4 and 7) were inflamed but by the end of the treatment the inflammation disappeared. At the end of the treatment a significant intensification of cellular infiltration (lymphocyte plasmacell stromareaction) in dogs (No. 2,3,5 and 7) and larger scale of regressive processes in the tumour cells (No. 1,2,3 and 7) took place. At the same time there were no significant changes in the tumours in dogs (No. 4,6,8,9 and 10).

The extracorporeal exposure of blood to polarised light may increase the immune activity of dogs with malignant and semimalignant tumours while no significant changes in the dogs with benignant tumour could be observed. It is suggested that polarised light may be a useful agent in the treatment of tumours exerting an effect via stimulation of immune competent cells.

The above series of treatment proved to be a successful model backing up our previous supposal, that extracorporeal treatment of blood by polarised light may be an effective method for the immune stimulations and through this a new therapeutical tool in the battle against cancer.

References

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Table 1. Treatment of dogs having spontaneous tumours with polarized light

Number	Breed	Age (year)	Sex	Body weight (kg)	Amount of blood (ml/kg) treated	Type and malignity of tumour
1	Poodle	12	F	8	1.9	Mesenchymal (malignant)
2	English setter	11	M	18	1.9	Epithelial (malignant)
3	Mixed breed	14	F	18	1.9	Epithelial (malignant)
4	German shepherd	9	M	32	1.6	Epithelial and mixed tumour (malignant and semimalignant)
5	German shepherd	8	F	35	1.4	Mixed tumour (semimalignant)
6	Spaniel	5	F	15	1.7	Epithelial (semimalignant)
7	Hungarian vizsla	8	F	24	1.7	Epithelial (semimalignant)
8	German shepherd	6.5	F	31	1.6	Epithelial (benign)
9	German shepherd	7	F	34	1.5	Mixed tumour (benign)
10	German shepherd	8	M	34	1.5	Epithelial (benign)