SIMULATED FIELD BLOOD STUDIES IN THE BOTTLE-NOSED DOLPHIN Tursiops truncatus

Authors: MEDWAY, W., and GERACI, J. R.

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SIMULATED FIELD BLOOD STUDIES IN THE BOTTLE-NOSED DOLPHIN *Tursiops truncatus*

I. Leucocyte Distribution between the Blood of Capillaries and Large Vessels.[1]

W. MEDWAY[3] and J. R. GERACI[2]

Abstract: To investigate possible reasons for the high percentage of eosinophilia in cetacean blood, the distribution of these cells between capillary and peripheral blood was investigated in nine bottle-nosed dolphins. There were no differences in blood values which could be attributed to site selection.

INTRODUCTION

Blood samples for hemographic studies in cetaceans have been obtained from the vessels of the pectoral[1] and dorsal fins, the flukes (tail)[2,3] periocular rete mirabile[4] and lateral tail stalk. Blood has also been drawn directly from the heart[5] and by cutting the trailing edges of the pectoral fins or the flukes.

With the exception of the capillary blood obtained by cutting the trailing edge, one can seldom be sure of whether the blood is arterial, venous, or mixed. This is due, in part, to the investment of the arteries by plexuses of veins, and to the subsequent difficulty in locating the needle within the desired vessel. Owing to manipulation and to inevitable withdrawing and repositioning of the needle, tissue juices carrying tissue-based cells, the eosinophils, may mix with the blood thereby biasing the results.

The widely divergent eosinophil counts in cetaceans[6] might possibly be influenced then, by the blood sampling technique. It is one of the questions which led to the present study.

MATERIALS AND METHODS

Blood was obtained from nine clinically healthy bottle-nosed dolphins at the Montreal Aquarium during a routine health surveillance program. Peripheral blood was obtained from one of the large vessels of the fluke,[3] placed in a tube containing the dipotassium salt of ethylenediaminetetra-acetic acid (EDTA), and used for the total white cell count, and preparation of smears which were made within 3 minutes of blood sampling. Capillary blood was collected, without anticoagulant, by cutting the trailing edge of the fluke. This blood was smeared immediately. The total white cell counts were made with the aid of a Sanborn counter (Sanborn Co., Waltham, Mass.).

All smears were stained with Wright's-Giemsa stain and at least 500 cells enumerated for the differential count.

Throughout the entire sampling procedure, the animals did not appear to be unduly stressed, a situation which otherwise may have influenced the outcome of this investigation.[1]

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[1] This paper was presented at the Conference of the International Association of Aquatic Animal Medicine, University of Guelph, Guelph, Ontario, Canada, April 29-30, 1971.

The Montreal Aquarium, Montreal, Quebec, [2] Canada and the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A. [3]

Dr. Geraci's present address is Department of Zoology, University of Guelph, Guelph, Ontario, Canada.

TABLE 1. Relative and Absolute Values of Blood Cells Based on Counting Approximately 500 Cells.

Animal #		Sex		Total WBC/mm³	Seg Neutro	Non-Seg Neutro	Lympho	Mono	Eos	Baso	Seg Neutro	Non-Seg Neutro	Lympho	Mono	Eos
			EDTA		436	1	40	12	9	—	19699	45	1807	542	407
Tt	6	F	Plain*	22500	438	—	41	5	12	—	19869	—	1860	227	544
			EDTA		368	1	39	6	86	—	8611	23	913	140	2012
Tt	7	F	Plain	11700	352	1	36	6	105	—	8237	23	842	140	2457
			EDTA		370	—	98	6	24	—	9659	—	2558	157	626
Tt	2	M	Plain	13000	381	2	90	3	24	—	9906	52	2340	78	624
			EDTA		388	1	69	—	42	—	13192	34	2346	—	1428
Tt	4	F	Plain	17000	402	—	52	1	45	—	13668	—	1768	34	1530
			EDTA		423	5	32	3	37	—	27072	320	2048	192	2368
Tt	15	F	Plain	32000	424	4	32	2	38	—	27136	256	2048	128	2432
			EDTA		320	—	51	4	125	—	8640	—	1377	108	3375
Tt	10	M	Plain	13500	325	1	56	2	116	—	8775	27	1512	54	3132
			EDTA		370	1	83	—	46	—	19240	52	4316	—	2392
Tt	3	M	Plain	26000	362	2	88	—	45	—	18980	104	4576	—	2340
			EDTA		399	4	42	7	48	—	37107	372	3906	651	4464
Tt	14	F	Plain	46500	414	3	38	7	38	—	38502	279	3534	651	3534
			EDTA		297	1	108	7	87	—	8910	30	3240	210	2610
Tt	16	F	Plain	15000	235	3	157	7	96	—	7078	90	4729	211	2892

* Plain — No anticoagulant

RESULTS

The results of the differential counts based on at least 500 cells are shown in Table 1. The values are expressed in both absolute and relative numbers. As can readily be seen, there was no significant difference between the blood sampled from capillaries and that drawn from the larger vessels of the flukes.

DISCUSSION

This study was unable to demonstrate any difference in white blood cell distribution between capillary and peripheral blood. Since the sampling methods adequately reflected those commonly employed in cetacea, it would appear that the consistently high and relatively variable eosinophil levels which are characteristic of this order, are not due to differences in sampling techniques. Nor are they apparently due to some of the factors which commonly induce eosinophilia in other mammals, such as parasitism, allergic response, etc.;[7] clinically healthy, parasite free dolphins retain high levels throughout their captive existence, however long.

Such levels are more likely based on a functional and perhaps evolutionary adaptation which is not specific to all orders of aquatic mammals nor to those which are exclusively marine. Rather, it appears to be a uniquely cetacean characteristic.

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