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EFFECTS OF DIVING ON PERIPHERAL VENOUS RENIN ACTIVITY IN THE HARBOR SEAL *Phoca vitulina*

A.P. Shapiro, Henry Berliner, H.V. Murdaugh, Jr., Department of Medicine, School of Medicine, University of Pittsburgh, Pittsburgh, Pennsylvania

Previous studies performed by investigators at Mount Desert Island Biological Laboratory and other marine stations have indicated that blood flow to the kidney ceases at the onset of diving in the harbor seal. Early studies using renal clearance demonstrated absence of urine production during trained diving followed by a transient impairment in concentration of urine suggesting but not demonstrating this change in renal blood flow. Arteriograms before and during diving documented the cessation of renal blood flow during the early dive period. Cardiac output in the seal decreases from seven to 10 percent of control values at onset of dive but increases slightly as the dive is prolonged to 15 minutes. The latter finding suggested the possibility that renal artery constriction did not persist during the entire duration of the dive. The availability of renin activity assay provided the opportunity to look into this last question. Accordingly extradural vein renin activities were monitored before, during, and after eight-minute dives in the harbor seal.

The seals were trained to dive under laboratory conditions as previously reported by the investigators. Diving was simulated using a teeter board with the seal comfortably restrained. A polyethylene catheter was inserted into the extradural vein via a thin walled needle using procaine anesthesia. Samples of blood with EDTA added as anticoagulant were obtained in duplicate before diving and sequentially during and after the dive. Samples were chilled, rapidly centrifuged, and the separated plasma was frozen. Renin activity assays were carried out using a modification of the Haber radio-immunoassay technique.

We completed four studies in three seals. During diving the renin activity did not increase but appeared to decrease slightly in three of the four studies. Post-dive, there was a brisk but transient rise in renin activity to as much as three times control value.

These data are consistent with persistence of renal arterial constriction throughout the period of the dive. The transient post-dive increase in plasma renin activity is presumably a result of renin production that occurred in the kidney during diving.

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THE MOLECULAR CHARACTERISTICS OF CERTAIN MAMMALIAN AND PISCINE MYOGLOBINS AND HEMOGLOBINS

George B. Theil, Mary F. Theil, The Medical College of Wisconsin, Milwaukee and the Veterans Administration Hospital, Wood, Wisconsin

The structural development of the globin protein of hemoglobin (Hb) and myoglobin (Mb) evolved from a common monomeric globular molecule with a molecular weight of about 17,000.