

a definite viremia in the adult hamsters. No viremia was seen in the blood of day 10 or subsequent bleedings.

These observations in the hamster agree generally with those previously reported for the human. In both instances, after an initial period of viremia, there was an interval during which no virus could be recovered, followed by reappearance of the virus for a short time and finally by permanent disappearance of the agent. There was a longer interval (3 days) in the human during which virus reappeared than in the hamster (1 day). This difference may have reflected an underlying quantitative antigen-antibody relationship since in the human in which viremia was most carefully observed (in this case a cancer patient), antibody was not evident until day 14, while in the hamster, titratable HA-I antibodies were present on day 7. It was noted previously(1) that the virus seen with the electron microscope during the "reappearance" in the human had a "motheaten" appearance, and it was suggested that this might have been due to the action of antibody even though none had as yet been observed. No electron microscope studies were done with the blood from the injected adult hamsters. However HA-I antibodies which were evident by day 7 were present on day 9 when infective virus was isolated. Neutralizing anti-

bodies in these sera were not titrated but it was learned that undiluted sera from days 6 through 14 as well as day 21, mixed with an equal volume of H-1 virus suspension, protected newborn hamsters injected with this material. Control animals inoculated with the same virus suspension mixed with an equal volume of normal hamster serum died in 6 days. Both the HA-I and neutralizing antibodies were specific for H-1 virus; they did not react with H-3 or Kilham's rat virus (RV), both of which are related agents.

It is difficult to say why whole blood from days 6 and 9 possessed "unneutralized" virus as observed by the tests in newborn hamsters while sera from the same days was effective in a protection test. It may be that the H-1 virus associated with cells or other particulate constituents of whole blood was not susceptible to the full effect of serum antibodies.

Summary. Subcutaneous injection of H-1 virus in adult hamsters produced a cyclic-type viremia and the appearance of titratable HA-I and neutralizing antibodies while viremia was still present.

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Coronary Artery Enlargement in the Hypoxic White Rat. (30280)

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Coronary arteries enlarge in white rats submitted to a simulated altitude of 22,000 feet for 2 hours a day for 15 days(1). Elevation of hematocrit and hypertrophy of the heart were noted. Whether change in the coronary arteries could be produced without changes in hematocrit or heart size was unanswered.

Method. Fifty, approximately 150 g, young, male litter mate, Sprague-Dawley rats

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were divided randomly into control and experimental groups. Of the latter, 12 were exposed to 18,000 feet simulated altitude (380 mm Hg pressure, pO_2 of 79 mm Hg) in a vacuum jar for 2 hours a day for 15 days. Twelve additional rats were exposed to simulated altitude of 22,000 feet (321 mm Hg pressure, pO_2 of 67 mm Hg) for 2 hours a day for 7 days. The remainder as controls were placed in the chamber at atmospheric pressure for comparable times. An electrical

TABLE I. Effect of Hypoxia on Size of the Coronary Tree (pO₂ 67 mm Hg) 2 Hours for 7 Days.

Coronary cast wt, mg		Coronary cast wt/ heart wt, mg/g	
Controls	Hypoxic group	Controls	Hypoxic group
2.7	5.5	2.6	5.3
2.3	5.8	2.9	5.0
3.9	4.6	3.9	5.3
2.4	6.8	2.5	7.9
2.8	4.7	2.3	4.7
2.8	5.1	3.3	7.1
4.4	4.8	4.7	4.0
2.5	4.3	2.2	3.9
2.8	3.4	3.5	2.7
3.5	5.2	3.3	6.9
3.6		3.2	
3.1		1.9	
3.2		3.1	
Means	3.1	5.0	3.0
S.E.	±.16	±.27	±.18
			±.49

pump moved 2.2 liters of air per minute through the jar at a barometric pressure of 320 mm Hg insuring adequate ventilation(2). Pressure was measured with a mercury barometer attached to the jar. The room was air conditioned and temperature within the jar stayed at approximately 24°C. Fifteen minutes were taken for gradual "ascent" and "descent." Rats were weighed weekly and at sacrifice. At sacrifice, the coronary arteries were filled by the beating heart from vinyl acetate injected into the aorta following the method of Tepperman and Pearlman(3). The hearts and the vinyl acetate casts were weighed together, digested in KOH, and the coronary casts carefully trimmed and weighed on a micro-balance. Micro-hematocrits were obtained from freely flowing blood of the animal's cut tail at sacrifice. Good filling of the coronary artery tree was achieved in 10 of 12 rats in each experimental group, and in 10 of 12 and 13 of 14 of the control groups respectively.

Results. The animals subjected to the

lesser altitude (18,000 feet) showed no change from their litter mates in the parameters determined. The group exposed to 22,000 feet (Table I) showed significant increase in mean coronary cast weights (3.8 mg *vs* 5.0 mg; $t = 6.04$, $P < 0.01$) and in mean coronary cast weight-heart weight ratios (3.03 mg/g *vs* 5.28 mg/g; $t = 4.4$, $P < 0.01$). There were no changes in hematocrit (48% *vs* 49%), heart weight (1.032 g *vs* 0.970 g), or body weight (191 g *vs* 186 g) of these animals compared to their controls.

Discussion. The initial response of enlargement of the coronary arteries by the animal submitted to intermittent hypoxia is interesting in relation to the studies of Stevenson *et al*(4). Following graded exercises in rats they demonstrated coronary artery enlargement, and this enlargement was as marked in animals exercised lightly as in those treated more strenuously. Tepperman and Pearlman showed that when heart enlargement occurred in exercised rats, the increase of coronary cast weight to heart weight declined. Possible benefit from increased coronary artery size in response to exercise and hypoxia seems attainable without adverse effects of increased hematocrit or increased heart size.

Summary. Using the vinyl acetate corrosion technique, enlargement of the coronary arteries in white rats subjected to hypoxia was demonstrated before changes in hematocrit or heart size.

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