In 16 persons with PH no significative change in NEFA and heart rate is produced (Figure 2A), while in 7 other persons the increase of NEFA and the heart rate after the postural change is significative (Figure 3A). An increment of the heart rate, blood pressure and NEFA is observed in 9 of the 16 persons group after the injection of NE (Figure 2B) while in the 7 persons group no change of blood pressure occurred but the heart rate and NEFA were increased (Figure 3B).

Discussion. The increase of NEFA after the postural change is due to lipolysis produced by catecholamines release, specially of NE in the sympathetic postganglionic endings. The release of NE by the adrenal glands is minimal after postural change[3,4]. The types of responses obtained in our subjects with PH, make possible 2 different typs of PH:

1. Asympathetic PH, by the breaking of the sympathetic reflex arch, causes no, or very small, release of NE in the sympathetic way, and PH with no or very small increase of heart rate and lipolysis (Figure 2A). The injection of NE in these cases raises the blood pressure and heart rate and produces lipolysis (Figure 2B).

2. PH of efector organ, in which the reflex arch is normal with good release of NE (the lipolysis is correct) but little response of the arteriole occurs (PH) (Figure 3A). The injection of NE in these cases has no influence on the blood pressure but the heart rate increases and produces lipolysis (Figure 3B).

Resumen. El cambio postural ocasiona un aumento significativo de los ácidos grasos libres plasmáticos. El test bioquímico postural propuesto es útil para distinguir hipotensión ortostática asimpáticotónica de la de órgano efector.

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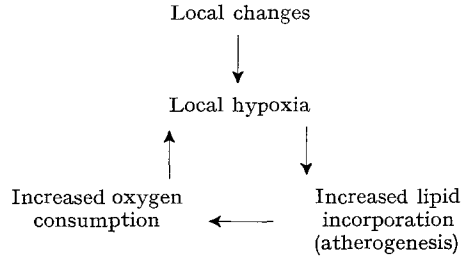
Proteins and Atherosclerosis

Several previous investigations have hypothesized that hypoxia at the blood-tissue interface is implicated in the initiation of atherosclerosis[1–3]. However, it is still not known what could bring about such a condition. We have recently postulated[4] that a reduction in the diffusion rate of oxygen from the blood to the vascular wall may be responsible for the hypoxic state, and that this decrease is due to increased levels of the plasma proteins. In vitro studies have shown that variations of albumin and γ-globulin over normal physiological ranges can result in a large decrease in the diffusivity of oxygen[5]. In addition, a correlation of proteins and age indicates that variations of the plasma proteins naturally occur with normal ageing in humans[6], which could possibly result in a continuous decrease of oxygen transport through the plasma.

The hypoxia-atherosclerosis has been well summarized in a diagram by Lazzarini-Robertson[7]:



Lazzarini-Robertson has named this 'the vicious cycle' and has suggested that the local changes which result in hypoxia may be due to hemodynamic changes. The purpose of our experiment was to determine if local changes brought about by increased plasma proteins would result in increased atherogenesis.

Thirty Dutch-belted rabbits were divided into 3 groups of 10. One group had serum albumin levels temporarily raised 1–2 g/100 ml from a normal value of approximately 4 g/100 ml by i.m. injections of isotonic concentrated albumin solution every 10–14 days for 6 months. A second group had serum γ-globulin levels raised to 130–150% of the normal value of approximately 0.75 g/100 ml by i.m. injections of isotonic contrated γ-globulin solution over the same time period. A third group was used as a control and all 3 groups were fed a 1% cholesterol rabbit chow, which has been found to result in atherosclerotic lesions in 3 to 4 months. Rabbit albumin was used to avoid immunological damage. However, human γ-globulin was used in order to see if the foreign

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Table I. Thicknesses of Aortae

Group	Thickness (mm)
No injections	0.387 ± 0.063
Albumin injections	0.456 ± 0.047
γ-globulin injections	0.606 ± 0.060

Table II. Lesion coverage of aortae

Group	Arch (%)	Thoracic (%)	Abdominal and Below (%)
No injections	62.5	18.3	15.8
Albumin injections	78.2	49.7	35.5
Gamma-globulin injections	86.1	49.7	22.4

protein might result in different effects on the vascular endothelium.

From the data shown in Tables I and II, it would appear that aortic atherosclerosis of the rabbits was more severe when the plasma protein levels were increased. The injections did not increase the protein levels significantly, though. Electrophoretic determinations showed that the protein levels were merely raised to the upper end of the normal range for rabbits. Thus, it may be possible that such changes could occur in the normal, ageing, human population.

In addition, it would appear that small dosages of foreign proteins (e.g., the human γ-globulin in this case) cause vascular damage similar to that caused by the species-specific protein. The fact that foreign proteins have been seen to cause changes in the permeability may thus, in fact, be partially due to their effect on the oxygen transport rate, instead of totally due, as is frequently assumed, to immunological reactions.

Résumé. Les examens macroscopiques et microscopiques effectués sur l'aorte des lapins ont été mis en corrélation avec le degré de concentration de la protéine plasmique. Les résultats indiquent qu'une augmentation des protéines plasmiques correspond a un degré plus élevé d'athérosclérose.

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Determination of the Vitamin A Bodypool of Rats by an Isotopic Dilution Method

An established feature of the metabolism of vitamin A is its accumulation and storage in the liver[1]; the size of this vitamin A store, however, cannot be determined by measuring the plasma vitamin A level since this level is in a constant range as long as the liver stores of the vitamin are not exhausted[2].

On the basis that a dose of vitamin A is transported to the liver by the blood and then takes part in a dynamic vitamin A exchange between liver, blood and the vitamin A-requiring organs[3], it may be assumed that the portion of an administered dose of labelled vitamin A in the normally constant plasma vitamin A level is small if the preexistant vitamin A bodypool has been large, and will be higher if the bodypool of vitamin A has been low. In order to find out whether this assumption is correct and could be used as a basis for an assay of the vitamin A bodypool, the following experiments have been carried out.

Experiment 1 was designed in order to prove that a dose of labelled vitamin A will be mixed within a certain time with the preexisting vitamin A bodypool of the rat. Thus, it was to be expected that the specific radioactivity of the vitamin A of plasma and liver would become the same after the mixing period. Table I shows the relatively constant levels of vitamin A in the plasma of 6 different rats; the total radioactivity, however, and the specific radioactivity of the plasma vitamin A differ significantly, obviously in correlation with the vitamin A status of the animals. Assuming that the specific radioactivity of the plasma and the liver vitamin A were equilibrated in each animal, the liver vitamin A was calculated by dividing the total radioactivity of the liver by the specific radioactivity of the plasma vitamin A. The calculated numbers and the result of fluorometric determinations of the liver vitamin A are in good agreement at least for animals with a low bodypool of vitamin A. These data indicate that in fact a new dose of vitamin A seems to become homogeneously intermixed with the preexisting vitamin A pool of the liver.

In experiment 2, the labelled vitamin A was injected i.v. in order to establish the same liver levels of labelled vitamin A in all experimental animals. Table II shows that the plasma vitamin A is quite similar in the different rats; but, as in the first experiment, the significantly differing values for the absolute radioactivity in the plasma and the specific radioactivity of the plasma vitamin A indicate little dilution of the labelled vitamin A by a small

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Table I. Specific radioactivity of plasma vitamin A; calculated and fluorometrically determined vitamin A content of livers (Experiment 1)

Rats treated with 10 μC of 6,7-$^{14}C_2$-retinol	Plasma			Liver		
	IU vit. A (100 ml)	cpm (100 ml)	cpm/IU vit. A	cpm (kg liver)	Calculated IU vit. A (g liver)	Analyzed IU vit. A (g liver)
On normal diet	135	58,600	434	397×10^6	915	1,680
On normal diet	135	99,100	734	466×10^6	635	920
Vitamin A-deficient diet	135	2,540,000	18,814	205×10^6	11	15
Vitamin A-deficient diet	124	2,140,000	17,258	509×10^6	30	30
Vitamin E-deficient diet	92	516,000	5,608	348×10^6	62	50
Vitamin E-deficient diet	102	708,000	6,941	456×10^6	66	53

Rats received orally an oily solution of 10 μC of 6,7-$^{14}C_2$-retinol (specific radioactivity: 43 μC per mg) and were killed after 5 days. Vitamin A in plasma and liver was determined by direct fluorometric measurement in the fat extract as described elsewhere[7]. Radioactivity was determined by tissue combustion according to KALBERER and RUTSCHMANN[8].