Hypertensin: the Substance Causing Renal Hypertension

AN increase in blood pressure is produced by compression of the renal artery[1] or by injection of the venous blood of the kidneys[2]. The filtrate obtained after adding 3 vol. of acetone to the serum of this blood contains a pressor substance which is insoluble in ether and amyl alcohol, soluble in glacial acetic acid and is destroyed only after three hours boiling in normal hydrochloric acid. The same substance is formed on incubating for fifteen minutes at 37° the kidney protein renin[3] with blood serum or its pseudo-globulin fraction. This substance, which we name hypertensin, is different from adrenalin, tyramin, pitressin and urohypertensin. Renin appears to be a proteolitic enzyme of the papain type, which liberates hypertensin from a blood protein belonging to the pseudo-globulin fraction.

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Relation of the Nucleolus to Secondary Constrictions

IN discussing the relation of the nucleolus with the *SAT* chromosomes, investigators do not appear to notice that the 'constriction' is probably *due* to the nucleolus, rather than an active producer of that body[1]. I imagine the chromosome in a close spiral. The nucleolus develops at a definite point in the chromosome and pushes the spirals apart until that part of the chromosome becomes a straight thread and apparently much thinner than the remainder of the chromosome. When the *SAT* chromosome in Navashin's Crepis[2] was not able to develop a nucleolus because the nucleolar material had already been removed by another chromosome, it had no satellite either. The darkly staining portions just below the thin stalk in McClintock's Zea chromosomes[3] could also be explained by the spirals beyond the nucleolus being pushed more closely together.

That a nucleolus can interfere mechanically with a chromosome is seen clearly in the salivary glands of Chironomus, the chromosomes in which often have enormous nucleoli. Here the usually fused homologues are seen to be separated in the region of the fused nucleoli and the chromatin of each homologue also is often much dispersed[4,5].

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IT is true, as Miss Melland states, that the nucleolus as it grows can interfere mechanically with the structure of a chromosome. It can, for example, stretch the filament which connects the satellite with the body of the chromosome. This is done by despiralizing the filament. Nevertheless the filament appears to be a spiral of a lower order than the spiral chromonemata which make up the body of the chromosome. It is already present in anaphase chromosomes before the nucleolus begins to appear. The same is true of secondary constrictions which give rise to nucleoli. These features of chromosome structure are for this and other reasons not produced by the growing nucleolus merely pushing the gyres of the spiral chromonema apart.

It is not possible to discuss the subject more in detail here. A series of papers are now in the press dealing with nucleolar production in a number of plant genera. The conditions vary in some respects from genus to genus, but there is evidence of various kinds that the nucleolar secondary constrictions as well as the nucleolar body in a *SAT* chromosome are definite loci of the chromosome, and that the secondary constrictions are already determined before the nucleolus begins to appear in telophase.

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Calcium in Ciliary and Muscular Movement

IT is interesting to note that the *unbalance* obtained by reducing the calcium content of physiological solutions can to some extent be offset by the addition of small quantities of lipoids to the solution. Thus frog heart rendered hypodynamic, or even arrested, by Ringer solution less varying amounts of calcium chloride, can be made to beat normally again by adding small quantities of sodium oleate, of sodium palmitate, of impure lecithin, or of ox blood thrombin to the Ringer, the *p*H being maintained unaltered. The effect was not observed with very pure lecithin or very pure kephalin, but a similar effect was obtained with lyso-lecithin, which first reduces the beat and also contracts the heart. Similarly, Clark and others[1] have shown that frog heart rendered hypodynamic by prolonged beating in Ringer solution shows increased activity when given extra calcium, sodium oleate, impure but not pure lecithin, impure but not pure kephalin, or serum. Ox blood thrombin, serum, and all but the purest samples of phospholipins contain traces of soaps which may well account for the activity of these substances in offsetting calcium deficiency. Mytilus cilia will beat for some time in artificial sea water at *p*H 6·5, but are quickly arrested if they are put in a similar medium at the same *p*H without calcium (removed as chloride)[2]. The ciliary beat is restored in such a calcium-free solution at the same *p*H if traces of one of the following substances are added: sodium dodecyl sulphate (the magnesium present rendered the oleate and palmitate of sodium insoluble and therefore ineffective), hexadecyl-trimethyl-ammonium bromide, lyso-lecithin, impure lecithin, or ox blood thrombin. Triolein, sodium butyrate and sodium glycerophosphate showed no restorative effect. In considering these facts, it should be noted that calcium is found to be more active under lipoid than under protein monolayers.

Heilbrunn[3] maintains that at least in some types