A PRELIMINARY NOTE ON THE ACTOMYOSIN FROM UTERUS STUDIED IN ULTRACENTRIFUGE

by

A. CSAPO, T. ERDÖS, J. NAESLUND, AND O. SNELLMAN

Institute of Physical Chemistry and Obstetric and Gynaecological Clinic, University of Upsala, Upsala (Sweden)

In the course of some investigations on the contractile substance in the uterus[1, 2] an additional study of the actomyosin and myosin obtained from the same material was also started in SVEDBERG's ultra-centrifuge[3]. The first aim was to gather some special data in order to continue the experiments along the proper lines. The investigations are still in progress but it seems to be of interest to give some information even at this preliminary stage.

The solutions of actomyosin obtained from uterus sediment in two polydisperse groups in the ultracentrifuge. One has a sedimentation constant of about 5 S and the other a higher constant (above 20 S).

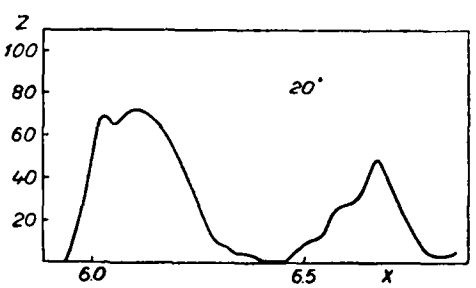

Fig. 1. Sedimentation diagram of extract of an uterus from a case of ten months pregnancy in 0.5 M KCl and 0.1 M K-veronal-acetate buffer pH 7. (Centrifugal field 250 000 g).

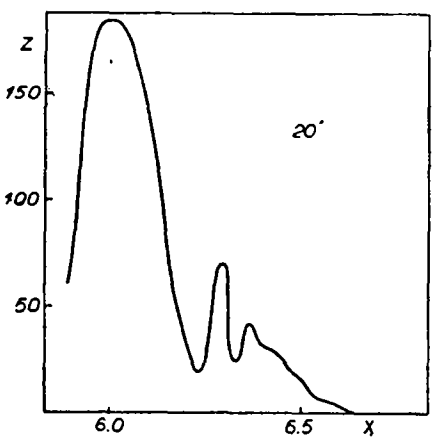

Fig. 2. Sedimentation diagram of extract of an uterus obtained from a non pregnant woman in 0.5 M KCl and 0.1 M K-veronal-acetate buffer pH 7. (Centrifugal field 250 000 g).

The amount of the more rapidly sedimenting material is greater in a solution prepared from uterus in pregnancy than in those obtained from uterus of non-pregnant women (Fig. 1 and 2). The material which sediments more slowly seems to correspond with myosin and the more rapid part with actomyosin. This is also in agreement with viscosimetrical determinations.

References p. 55.

While investigating solutions of precipitated and redissolved material we have found that the contractive ability of such material is poor and that the relation between actomyosin and myosin is altered so that the percentage of actomyosin in the material is increased[2]. Even here the relation between the two components is altered. The amount of the more rapidly sedimenting component increases after every precipitation as compared to the amount of more slowly sedimenting material.

Experiments aimed at preparing crystallized myosin from uterus according to the method developed by SZENT-GYÖRGYI[4] did not succeed. This method gave a very

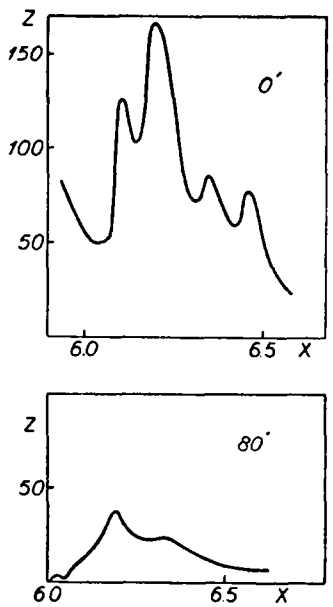

Fig. 3. Sedimentation diagram of precipitated and redissolved uterus actomyosin in 0.5 M KCl and 0.1 M K-veronal-acetate buffer p_H 7. Upper figure: Actomyosin component. (Centrifugal field 250000 g).

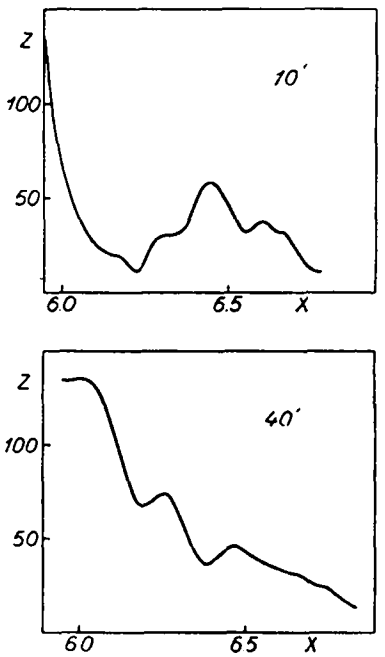

Fig. 4. Sedimentation diagram of uterus actomyosin in presence of ATP in 0.5 M KCl and 0.1 M K-veronal-acetate buffer. Upper figure: Actin component. (Centrifugal field 250 000 g).

poor yield and the myosin thus obtained was always contaminated with actomyosin and did not crystallize. According to AMBERSON[5] sodium pyrophosphate promotes the extraction of myosin. But with this method extracts were obtained containing a large amount of actomyosin.

Experiments were even made to purify actomyosin by repeated precipitation. Fig. 3 shows a sedimentation diagram made in such an experiment. The solution contains a small of the material with low sedimentation constant.

On adding ATP to such a solution the component referred to as actomyosin disappears in the sedimentation diagram and instead of this the component F-actin and the slowly sedimentation material previously referred to as myosin are visible (Fig. 4).

References p. 55.

The latter material is exceedingly polydisperse and the sedimentation picture does not agree with that found for the crystallized myosin of striated muscle[6].

The conclusion we can draw from our investigations is that the myosin obtained from uterus is not in the same state as that obtained from striated muscles. As far as the authors know this is the first time differences have been formed between various kinds of myosin.

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