it can be stated that the decrease in the transport capacity facilitates the de-adsorption of lipids, thus facilitating their elimination from the blood. As a result of the continuous increase in the lipids available to the tissues, after a certain period, a shift in the site of fixation from the carrier protein towards the secondary surfaces of the endothelium into the vascular walls can be noted. If the pathogenetic picture of atherosclerosis with the multiple role of the modifications affecting the transport medium could be completed, it would undoubtedly contribute to a better understanding of this disease and open new vistas in its therapy. This could be achieved by increasing the blood transport capacity by way of drugs and through the prevention of the excessive loading of the transport capacity of plasma proteins.

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## Testicular Calcinosis in Domestic Ruminants

CALCIFICATION in the testes of bulls has been the subject of a few reports over several decades[1–3]. Accounts of the condition have been mainly concerned with its incidence in surveys and theories on its aetiology. It is established now that the condition is usually bilateral in its occurrence, varies in degree, and is by no means rare. There is general support for a hypothesis that semen statis is a fundamental factor in the development of the condition[4,5]. Doubt has been cast on the reproductive significance of such calcification with the statement that, *per se*, it does not necessarily indicate infertility[3]. The association between the condition and fertility has not otherwise been closely considered.

We have investigated calcinosis (using Selye's terminology[6]) in the testes of domestic ruminants by assessment of gross calcinosis on cut surfaces of affected testes from sheep, goats and bulls with known breeding histories and by occasional histo-pathological examination of affected testes. Our aim has been to obtain clarification on (*a*) the degree of association between testicular calcinosis, sperm abnormalities, and infertility; (*b*) the sequence of events in the tubular tissue leading to calcium deposition; (*c*) the consistent and several characteristics of the condition in cattle, goats and sheep. The broad results of these observations to date are summarized as follows.

Testicular calcinosis occurred in association with lesions in the epididymis or adjacent testicular parenchyma. Masses of dead spermatozoa gathered in related collecting tubules and occluded them; such tubules ruptured with spermatocoele and granuloma formation as a common result. Seminiferous tubules in affected testes showed atrophic change and testicular shrinkage was sometimes apparent. The calcification process appears to become established by way of saponification, with granule formation in sperm masses.

Generalized testicular calcinosis was associated with reduction in semen qualities and hence with varying degrees of infertility. Advancing degrees of gross calcification progressed through oligospermia, of the order of 4,000 sperms per ml., to azoospermia.

Intermediate degrees of bilateral calcification were associated with some fluctuations in the quality of ejaculates. Fair to poor motility of spermatozoa was a fairly constant feature on microscopic examination of warmed samples of whole semen. Abnormal morphology varied, but consisted chiefly of defects of the neck and tail, for example, separated heads and tails, and bent tails.

Subjects with unilateral calcinosis of an intermediate degree gave semen samples which varied considerably, particularly with regard to the percentage of abnormal sperm forms. Motility was usually poor, seldom good. Advanced cases were sterile whereas intermediate cases showed varying degrees of fertility about or below the lower level of common fertilizing rates (for example, 60 per cent lambing rate to a Suffolk ram with unilateral calcinosis to an intermediate degree). Some very mildly calcified testes have been found in subjects with histories of average fertility, but no reputedly highly fertile sire has been found with gross testicular calcinosis.

No true age incidence is apparent; advanced cases have been found in young subjects.

Compared with the widely confirmed incidence of up to 30 per cent in bulls, the approximate incidence of significant calcification appears to be relatively low in sheep (3 per cent) but high in goats (up to 40 per cent), in which latter species the condition, in its advanced form, obviously contributes to the common sterility of males.

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# RADIOBIOLOGY

## Stable Bromine and Activation Analysis in Protein Tracer Studies

ALTHOUGH the judicious use of radioisotopes such as iodine-131 and iodine-125 for tracing proteins in metabolic studies in man may result in very little iatrogenic exposure of the subject to radioactivity, a general method for labelling such proteins which would not expose the patient to even this small amount of radiation would be preferable, especially in infants and pregnant women. In the present investigation, the feasibility of using neutron activation in the study of the metabolism of proteins labelled with stable bromine, bromine-79 and bromine-81 was explored; the latter isotopes have suitable cross-sections for thermal neutron capture, bromine-79 being activated to bromine-80 (half-life of 4·4 h) and bromine-81 being activated to bromine-82 (half-life of 36 h) (ref. 1).

Human serum albumin and human serum IgG were labelled with stable bromide which contained equal parts of bromine-79 and bromine-81. 1·0 ml. of 0·1 N hydrochloric acid was added to 4 μmoles of potassium bromide in 0·05 ml. water; the bromide was oxidized to bromine with 0·05 ml. of 12·5 per cent sodium hypochlorite solu-