chloride). The rate and extent of superprecipitation of natural actomyosin from white fibres were 25–50% greater than those of natural actomyosin from red fibres. It remains to be established how the contraction times of the red fibres and the white fibres are related to their myosin adenosine triphosphatase activities.

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Post-Mortem Autolysis in Bovine Muscle

By W. J. REVILLE, M. G. HARRINGTON and R. L. JOSEPH. (*Department of Biochemistry, University College and The Agricultural Institute, Dublin 2, Irish Republic*)

Muscle becomes hard and inextensible during the onset of rigor (Bendall, 1960), but during subsequent storage at 2°C there is a progressive increase in tenderness. The ability to maintain isometric tension is lost (Jungk, Snyder, Goll & McConnell, 1967), but the muscle does not regain its extensibility. These changes during storage are believed to be caused by post-mortem autolysis. A study of the myofibrillar ultrastructural changes over the storage period essential to an understanding of the nature of this autolysis is reported. Proteolysis in the sarcoplasmic fraction and release of lysosomal cathepsin D were also investigated.

Bovine semitendinosus muscle was sampled immediately *post mortem* and after 24h, 4 days and 10 days storage at 2°C for light and electron microscopy. The supernatants obtained after centrifuging homogenates from 0h, 2-day and 15-day post-mortem samples for 30min at 1000g (r_{av} 7.62cm) at 4°C were applied to an exponential sucrose density gradient in the BXIV aluminium zonal rotor and centrifuged for 45min at 43000g (r_{av} 4.7cm) at 5°C. Collected fractions were analysed for protein (Schuel & Schuel, 1967) and cathepsin D activity (Anson, 1937).

The phase-contrast microscope showed a progressive increase in incidence of transverse fibre breaks during the storage period. These breaks always occurred in the I band.

Pre-rigor myofibrils in the electron microscope had the appearance of resting muscle (Huxley, 1960). The Z lines showed a well-defined fibrillar

pattern (Landon, 1970), which gradually turned amorphous during subsequent storage. The other components of the myofibril were not significantly affected by storage for 10 days. The ultrastructural locus of the fibre breaks seen in the light microscope was the Z line/I band junction (Reville, Joseph & Harrington, 1971).

The amount of sedimentable protein decreased during storage. In pre-rigor samples 52.5% of the total protein was sedimentable, whereas 2-day samples showed 27.5% and 15-day samples only 18% sedimentable protein.

The total activity of cathepsin D did not change appreciably over the storage period, but of this 84.5% was sedimentable in pre-rigor samples and 40.7% after 15 days.

The limited and specific ultrastructural disruption of the myofibrillar fraction occurring during storage would undoubtedly result in increased tenderness and loss of ability to maintain isometric tension. The sarcoplasmic fraction undergoes a more extensive autolysis, but all the cathepsin D activity does not seem to be released during storage. This agrees with Valin (1970).

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Light-Scattering Rayleigh Linewidth Measurements on G-Actin

By G. N. GRAHAM and D. B. SELLEN. (*Astbury Department of Biophysics, University of Leeds, Leeds LS2 9JT, U.K.*)

Light-scattering by solutions has been used as a method for finding macromolecular parameters for the past 25 years. During the past decade, however, it has become possible, largely owing to the advent of the laser, to investigate the spectral distribution of the scattered light (see Cummins, Knable & Yeh, 1964; Dubin, Lunacek & Benedek, 1967; French, Angus & Walton, 1969; Rimai, Hickmott, Cole & Carew, 1970; Pecora, 1970; Ford, Karasz & Owen, 1970; Sellen, 1970; Foord