ACTA STEREOL 1983; 2/1: 193-194
SHORT NOTE

COMPUTER MNEMONICS FOR THE STEREOLOGY OF A FIBROUS SYSTEM

Howard J. Swatland
Department of Animal and Poultry Science
University of Guelph, Guelph, Ontario, Canada

ABSTRACT

ASCII (American Standard Code for Information Interchange) characters are used to label data and to annotate computer programs for the stereology of a fibrous system.

NOMENCLATURE

There is now some standardization of the nomenclature used to present stereological data and theorems. However, the existing system has two major faults: (1) it is difficult to use on a computer, and (2) it is inadequate for the stereology of fibrous systems. With the microcomputers and matrix printers used in most biological laboratories, time and effort are wasted if Greek characters are used for statistics, and if superscripts and subscripts are used for stereology. Stereology, so far, has been dominated by the analysis of systems in which the basic structure is assumed to be an evenly dispersed set of essentially spherical inclusions. In fibrous systems, the whole geometry is radically different. There is often a hierarchy of concentric groups of elements: in skeletal muscle for example, there are fasciculi, fibres, fibrils and filaments. Instead of stereological unfolding on the basis on the probability of different sized sections of a sphere, the interaction of cross-sectional area and longitudinal distribution is based on conical or

pyramidal sectioning (tapered ends of a prismatic fibre). The following system was developed for the management of a large database on muscle growth in farm animals. It is used to sort through the filenames of stored data, and to annotate computer programs.

Three essential units of information (class of measurement, subject and parameter) are condensed to a single statement by using upper and lower case characters (CLASSsubjectPARAMETER) or a string separator (CLASS|SUBJECT|PARAMETER). Having constructed statements without internal spaces, it is now possible to use spaces to separate different statements in mathematical operations.

The class of measurement includes items such as MEAN and SUM. Qualifications such as REAL (all elements theoretically possible) and APP (apparent, only the countable elements) are appended after a colon (MEAN:APP).

In skeletal muscle, the fibrous subjects of measurement include fasciculi (mfs), fibres (mfr), fibrils (mfl) and filaments (mft). The first letter of the mnemonic is a tissue type (m = myo-). Subtypes of subject are appended after a colon, such as a histochemical white-type of muscle fibre (mfr:w). Subtypes may be grouped with an ampersand (mfr:r&i).

The parameters of measurement include items such as area (A) and number (N). The basis of sampling is appended after a slash, such as, N/A, number per area. The orientation of the basis of sampling is appended after a colon, such as, number per area in a radial plane of the fibrous system (N/A:R). Coordinates with respect to the length of the system are appended after a semicolon. Muscle midlength, for example, is N/A:R;0.5L. The defined test area is appended after a comma, and may be biological (MEANmflN/A:R;0.5L,mfr) or metric (MEANmflN/A:R;0.5L,0.001). Millimetres are used since they are at the interface of macroscopic and microscopic measurements: their power is set by the nature of the parameter (1-, 2- or 3-dimensional).