

# Patterns in skeletal muscle diagnosis

## Dianne Reader<sup>1</sup>, Dr Tamara Sztynda<sup>2</sup>, Dr Janice Brewer<sup>3</sup>

<sup>1</sup> Anatomical Pathology, Pathology North, RNSH Reserve Rd St Leonards, NSW 2065 <sup>2</sup> University of Technology Sydney PO Box 123 Broadway Ultimo NSW 2007 <sup>3</sup> Anatomical Pathology, Pathology North, RNSH Reserve Rd St Leonards, NSW 2065

### ABSTRACT

Art and science have many things in common and one is pattern association. These patterns seen in connection with skeletal muscle fibre type staining are not dissimilar in appearance to artist paintings seen on the walls of galleries.

Histology is seen by many as a form of art. The staining of any tissue can be a work of art. This form of art work is regarded as a diagnostic tool used in medicine.

A – normal skeletal muscle staining with H&E

- B ring fibres of myotonic dystrophy
- C inclusion body myositis
- D myofibre hypertrophy and splitting fibres
- E myopathic rounded atrophic fibres
- F typical rhabdomyositis pattern
- G group atrophy of fibres

Normal skeletal muscle patterns are referred to as mosaic or checkerboard due to their even distribution of the main two fibre types. These patterns are a complete contrast when genetic or inflammatory disease processes are present. These patterns change with disease and are seen as either a predominance of one fibre type or the size and shape of the muscle fibres themselves are described as geometric or angular.

Staining colour of the muscle fibres can be muted, subtle, contrasting or show a altered fibre distribution, alterations in size and shape of muscle fibres which are dramatically beyond the normal. Even the way that the muscle fibre nuclei are distributed throughout the muscle bundle can look like ant trails or clusters. Much of the terminology used to describe every part of the muscle fibre are words used in art to describe paintings such as swirls or stippled or appearing to have splatters of material throughout the fibre.

Leonardo Da Vinci was fascinated by the human form and anatomy. He produced illustrations with uncanny accuracy. Following from his anatomy meets art, histology has become an art form of its own. The use of human or animal tissue produces our own version of the renaissance art with a modern twist, forming patterns that in themselves are used to diagnose neuromuscular disease.

- - H normal skeletal muscle staining with ATPase pH 9.4 counterstained with Azure A
  - I fibre grouping
  - J denervation showing small, dark angular fibres
  - K moth eaten fibres as seen in chronic
  - L –reinnervation showing target fibres
  - M- type 2 atrophy

#### CONCLUSION

With the basic anatomical structure of normal muscle providing a foundation for understanding common patterns of fibre change which is observed in muscle disease, and using the Haematoxylin and Eosin (H&E) stain to help with the initial canvas for diagnostic design, the artistic side of Histology emerges.

N – ATPase at pH 4.63, showing predominance and smallness of type 1 fibres (darker fibres). Clear fibres are of type 2.

### Referencing

**Photos by Author** http://neuropathologyweb.org/chapter13/chapter13bDenervation.html http://neuromuscular.wustl.edu/lab/mbiopsy.htm

O – Phosphorylase normal staining

P – Cytochrome c oxidase/succinate dehydrogenase (COX-SDH) staining

Q - Gomori Trichrome



**X**UTS