Application Note

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Neuromuscular Junction Studies

Dr Guy Bewick in the Department of Biomedical Sciences at the University of Aberdeen carries out research into synaptic plasticity and an important aspect of this is relating the structure of the neuromuscular junction to its function. Three dimensional information is therefore of great importance to Dr Bewick, some of which is very difficult to gain from images displayed in two dimensions.

Using ***Volocity***, a Z series of images from a confocal microscope or deconvolved images can be processed very quickly and easily to produce a 3D rendering. This allows structures to be visualised and explored in ways never before possible on a desktop computer.

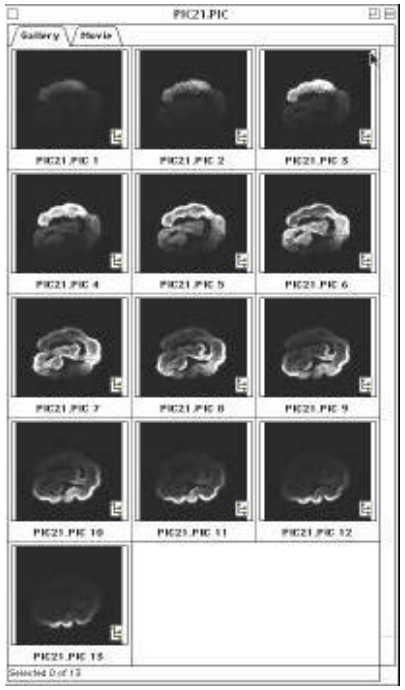
Dr Bewick provided a Z series of Bio-Rad confocal images through a neuromuscular junction from a rat muscle fibre. The acetylcholine receptors of the junction were labelled using Rhodamine-conjugated _-bungarotoxin (snake venom), and images were captured at 0.5µm intervals.

A gallery view of the image set in ***Volocity*** is shown here, together with one view of the 3D rendering.

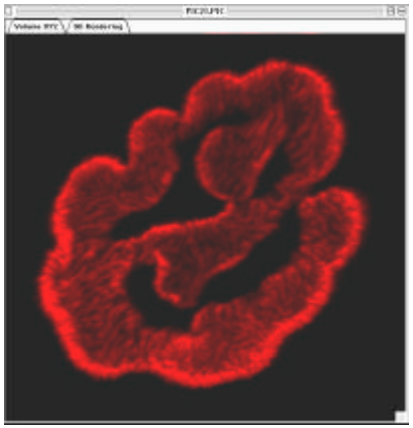
From the rendering Dr Bewick was able to see the concentrations of receptors at the crests of the postsynaptic folds and in particular, a curved lip to the synaptic gutter which he had never visualised so clearly before using fluorescence microscopy.

A second set of images was also processed which allowed Dr Bewick to explore a muscle spindle in greater clarity than had previously been possible using light microscopy.

Another advantage of using ***Volocity*** is that Dr Bewick can share his results with colleagues by saving the renderings as cross-platform QuickTime Virtual Reality movies.



Volocity Gallery view of Z series image set, rat neuromuscular junction



One view of the 3D rendering produced in ***Volocity***