

# Guidelines For Preparation and Sending BIOPTONICS Specimens

## General information on Specimens

Specimens with a diameter of 1-10mm and length of up to 15mm can be processed.

**All excess** membranes should be removed before shipping, as BIOPTONICS will do no further preparation of your specimen prior to OPT scanning. Excess membranes interfere with scanning which results in poor quality movies.

## Unstained Specimens

These can be scanned to show anatomy and morphology if there is sufficient autofluorescence in the specimen.

## Coloured Specimens

**DAB** stained specimens should be pale brown **not** dark brown/black. Specimens, which are too darkly stained, cannot be scanned.

**NBT/BCIP** staining should not be overly dark, see attached photo (Fig 1) of a suitable stain intensity. Non-specific background signal should be as low as possible. NBT/BCIP stain is soluble in BABB which is used in OPT process; therefore very pale staining may disappear before the specimen can be scanned. We have found that an NBT final concentration of **10-45ug/ml** is optimum for OPT. Higher concentrations can lead to background colour developing during scanning process. This can result in poor quality movies. It is **IMPERATIVE** to wash specimen thoroughly after stopping NBT/BCIP reaction. We recommend washing in large volumes of PBS (50mls) with agitation, for 48hours, changing PBS at least 4 times before fixing in 4% PFA.

Figure 1

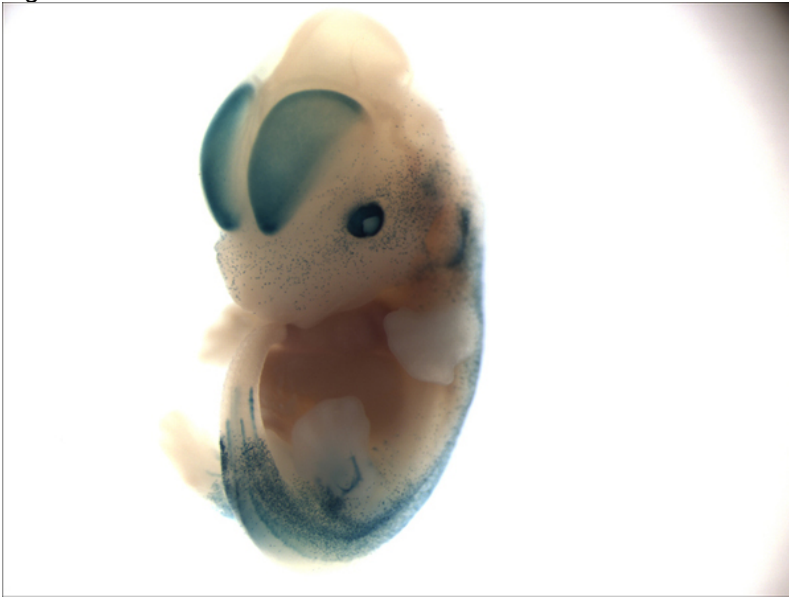


**X-Gal** staining should be relatively dark. It is very soluble in BABB (more so than NBT/BCIP) therefore very pale staining will disappear before specimen can be scanned.

**X-Gal/NBT** Addition of NBT to X-Gal reaction stabilises the X-gal signal making it less soluble in BABB. Replace iron in X-Gal stain buffer with NBT final concentration of **50-100ug/ml**. For the best OPT results, the resulting stain intensity should be similar to that shown in Fig 2. Note that addition of NBT will produce a different shade of blue to that obtained with X-Gal alone.

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Figure 2



It is **IMPERATIVE** to wash specimen thoroughly after stopping X-Gal-NBT reaction. We recommend washing in large volumes of PBS (50mls) with agitation, for 48hours, changing PBS at least 4 times before fixing in 4% PFA.

It is possible to scan X-Gal or NBT/BCIP-stained specimens, which have subsequently been fluorescently labelled but not possible to scan specimens stained with more than one visible or coloured stain.

## **Fluorescent Specimens**

OPT can be used for imaging fluorescent dyes, for example in Fluorescent Immunohistochemistry or Fluorescent wholemount *in situ* hybridisation.

**GFP expressing specimens** cannot be directly viewed using OPT due to the pre-scanning processing required. Specimens immuno stained using fluorescently tagged antibodies against GFP can be scanned with OPT. Please contact us for protocols.

**Fluorescent Antibodies.** Either single or double-labelled specimens can be scanned. We currently use GFP2 and CY3 filters for scanning signal see table for filter properties. Other filters may be available on request. N.B. Cy3 signal will bleed through into GFP2 channel; it will not be distinguishable from GFP2 signal (e.g. Alexafluor 488) in section & 3D movies.

**Tyramide** Specimens should have as low background signal as possible. Signal may fade when exposed to light during OPT scanning. GFP2 and CY3 filters are used for scanning

## **Post-Staining**

Specimens should be fixed in 4% PFA overnight. Wash well in PBS, before shipping.

## **Specimen Info**

Please complete all the details on attached form & send with the specimens.

## **Shipping**

Specimens should be shipped in 2ml cryotubes, or similar. Please ensure there is only 1 specimen per tube. Fill to brim with PBS. There should be no air bubbles, as this can lead to specimens being damaged in transit. Label each tube clearly with your unique ID of up to 12 letters & numbers (starting with a letter) Tubes should be sealed with parafilm then wrapped in absorbent material, sufficient to absorb any leakage. Fluorescent & NBT/BCIP specimens should be sealed in a light-tight container.

Ensure all packaging is compliant with IATA DGR packing instruction 650, and that UN3373 label is clearly displayed. Contact your courier company for further details.

Please inform us by email [info@bioptonics.com](mailto:info@bioptonics.com) when specimens are posted.

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## **Shipping from outside the UK**

For examination at the Border Inspection Post, attach the following documentation to the outside packaging:

1 – A copy of our import licence - please contact us for this document.

2 – The following information is required on an “Identifying Document” which must be written on letter headed paper with an original signature and date:

- **Type & origin of tissue including species if known.** e.g. mouse lung CD1
- **Number of specimens**
- **How are they identified** e.g. specimen ID
- **How and what they are packed in** e.g. plastic tubes containing phosphate buffered saline
- **Country of origin**
- **Final use** e.g. scientific research analysis

## **Payment**

A Purchase Order **MUST** be sent with specimens. Contact Kevin Smith on +44 (0) 131 311 7029

[Kevin.Smith@tech.mrc.ac.uk](mailto:Kevin.Smith@tech.mrc.ac.uk) with any queries regarding purchase orders.

**SUBMISSION OF PURCHASE ORDER INDICATES ACCEPTANCE OF MRC TECHNOLOGY'S STANDARD TERMS AND CONDITIONS.**

*If VAT exempt, please provide a copy of your certificate from Customs and Excise*

## **Receipt of Specimens**

All specimens will be reviewed for suitability.

Any damaged specimens will be reported via email before scanning commences.

## **Scanning Process**

### **Day 1**

Wash sample in PBS.

Embed sample in a deep petri dish containing 1% LMP agarose.

Trim excess agarose so that sample is suspended vertically in the centre.

Attach the agarose block with super glue to a metal mount.

Trim agarose to form an octagon with each face angled outwards.

Start methanol dehydration.

### **Day 2**

Dehydrate in methanol with 2-3 changes. Clear sample in Benzyl Alcohol : Benzyl Benzoate (Murray's Clear) overnight. Large samples may require 24+ hours to clear completely.

### **Day 3**

OPT scan

### **Day 3 - 7**

Process dataset through Bioptonics pipeline to produce an OPT Imaging Package.

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## **Results**

An **OPT Imaging Package** is the Product resulting from the OPT imaging of one Specimen.

Each **Stained Specimen OPT Imaging Package** consists of:

- Series of virtual sections through the specimen in 3 orientations. These include 1 monochrome series for each channel (stacks of png files [for sagittal orientation only] and an mpeg movie for each orientation) and a colour series for the merged channels (stacks of png files and an mpeg movie for each orientation).
- 3D movies and their associated png files. These are colour movies of merged data. These will be based on our experience and expertise in 3D visualisation of biological specimens to provide a series of high-quality movies. Movies will consist of standard trajectories and will include surface rendering, volume rendering and cut-aways. 12 movies will be provided for each specimen, along with their associated png files.
- Original Projection Images. The original projection images for each channel are supplied as a TIFF stack and in mpeg format.

Each **Anatomy Only OPT Imaging Package** consists of:

- Series of virtual sections through the specimen in 3 orientations. These include merged monochrome series (stacks of png files and an mpeg movie for each orientation) and unmerged monochrome series (stacks of png files [for sagittal orientation only] and an mpeg movie for each orientation)
- 3D movies and their associated png files. These are monochrome movies of merged data. These will be based on our experience and expertise in 3D visualisation of biological specimens to provide a series of high-quality movies. Movies will consist of standard trajectories and will include surface rendering and cut-aways. At least 5 movies will be provided for each specimen, along with their associated png files.
- Original Projection Image. The original projection image is supplied as a TIFF stack and in mpeg format.

## **Return of Specimens**

Specimens are not normally returned.

## **Address to send Specimens:**

BIOPTONICS  
MRC Technology  
Crewe Road South  
Edinburgh EH4 2SP  
United Kingdom

**Tel:** +44 (0)131 311 7029

**Fax:** +44 (0)131 311 7025

**email:** [info@bioptonics.com](mailto:info@bioptonics.com)

**Website:** [www.bioptonics.com](http://www.bioptonics.com)



Please fill in, print out and return hard copy with your Specimens:

<b>Contact Name</b> For specimen queries	
<b>Address</b>	
<b>Email address</b>	
<b>Telephone Number</b>	

<b>Contact Name</b> For sending CD's (If different from above)	
<b>Address</b>	
<b>Email address</b>	
<b>Telephone Number</b>	

<b>Purchase Order No.</b>		<b>Total Cost</b>	
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<b>Any Additional Relevant Information-</b>
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