

# New Mass Cytometry Sample Preparation and Helios Acquisition Protocols

## Frequently Asked Questions

### What are the new protocols for mass cytometry that I have been hearing about?

Fluidigm has released updated protocols for all cell staining and fixation procedures. The most important update is the use of freshly prepared formaldehyde fixative on each day that cells are stained. The updated protocols can be found [here](#).

Fluidigm has also released a new protocol for sample acquisition on Helios™ systems. This protocol uses a high-ionic-strength running solution called Maxpar® Cell Acquisition Solution (CAS; Cat. No. 201237). Use of CAS combined with the new cell staining protocols has been shown in some cases to improve signal intensities and CVs for metal isotope-labeled cell signals. When CAS is used for sample acquisition, a newly designed injector (WB Injector, Cat. No. 107950) must be used to reduce deposit buildup. Contact Fluidigm [Technical Support](#) or your field application scientist for more information.

### Should I implement the updated cell staining protocols immediately?

If you are starting any new studies or sets of experiments, we recommend that you use the updated staining protocols. If new experiments are to be part of an ongoing study, we strongly suggest that you perform a bridging study first. Contact your Fluidigm field application scientist if you are unsure how to proceed with such studies.

### How is this new cell staining protocol different from previous Fluidigm protocols, and what makes it better?

The biggest change is that the updated protocols all call for use of freshly prepared 1.6% formaldehyde solution. Fluidigm recommends using ampules of Pierce™ 16% (w/v) Formaldehyde, Methanol-free (Thermo Scientific™ Cat. No. 28906, 10 x 1 mL). Other sources of fixative are available. Please contact

your field application scientist for more information. Optimal staining and cell integrity is only obtained using fixative prepared from a new ampule daily.

If your Helios operator is implementing the WB Injector with Maxpar Cell Acquisition Solution protocol for sample acquisition, then a wash step with Maxpar PBS (Cat. No. S00125) followed by resuspension in CAS is used in the final steps of the protocol instead of washing and resuspending in Maxpar Water. Talk to your Helios operator about the sample preparation and acquisition protocol to be used.

## **Why do I have to use the new Maxpar Cell Acquisition Solution? Why can't I just keep using water?**

You do not have to use the Maxpar Cell Acquisition Solution. However, its development was driven by a desire to create a more favorable environment for cells than provided by resuspension in Maxpar Water. We are committed to continually improving quality, and therefore we carefully devised a new running solution. Maxpar CAS has higher ionic strength than water, and when used in conjunction with the WB Injector it improves cell integrity and thus increases cell-signal stability while maintaining acceptable system performance.

When using Maxpar CAS, the WB Injector must also be used to reduce deposit buildup inside the injector. The use of CAS with the WB Injector has only been tested on Helios mass cytometers.

Consult with your Helios operator about implementing this new sample acquisition protocol for your experiments.

## **I heard that a new injector and running solution can be used on our mass cytometer. Should I ask my operator to use those when I run my next experiment?**

All facilities with Helios and CyTOF® 2-to-Helios Upgrade mass cytometers are being informed of a new sample acquisition protocol that has been shown in some cases to improve intensities and CVs on signals from metal isotope-stained cells. The protocol uses a higher-ionic-strength running solution, called Maxpar Cell Acquisition Solution. The WB Injector is always used with CAS because this injector design reduces deposit buildup.

Consult your instrument operator with questions about implementing the new sample acquisition protocol for your experiments. As with any protocol change, appropriate bridging studies should be performed if needed. This may include re-optimizing the workflow by re-titrating antibodies and adjusting the event rate for the WB Injector. Consult your Fluidigm field application scientist if you need advice on such studies.

## **Can this new sample acquisition protocol be used on any mass cytometer?**

The use of the WB Injector and Cell Acquisition Solution has only been validated on Helios and CyTOF 2-to-Helios Upgrade mass cytometers.

## **Why is the use of CAS and WB Injector only recommended for Helios? Wouldn't samples run on any mass cytometer benefit from being resuspended in CAS?**

Although we have not rigorously tested the use of Cell Acquisition Solution (CAS) with samples run on CyTOF 2 systems, it is likely that some benefit to cell signal strength and stability would be seen on those systems as well. Internal testing is underway on CyTOF 2 systems.

## **Is the cleaning procedure any different for this new injector?**

The procedure is the same. However, the WB Injector needs more frequent cleaning than the HT Injector. It is recommended that after each day (8 hours) of acquisition, the injector be rinsed with distilled, deionized water and dried thoroughly before you perform additional experiments. Weekly cleaning with 10% Decon™ Contrad® should still be performed following the instructions in the Helios User Guide (PN 400250).

The Sampler and Skimmer-Reducer Cones need more frequent cleaning as well, after approximately 12 hours of running with Maxpar Cell Acquisition Solution as carrier. Follow the standard procedure for cone cleaning as described in the Helios User Guide.

## **How can I tell the difference between the new injector and my existing injector?**

The new WB Injector is inscribed with the letters WB near the base of the injector in front of the ball joint.

## **How do I order the new injector? How much does it cost?**

The first WB Injector is supplied free of charge along with a supply of Maxpar Cell Acquisition Solution. Please contact your field application scientist (FAS) if you would like to try out the new Helios sample acquisition protocol and your FAS will help you place the order. Additional injectors can be purchased through [Fluidigm](#) by referencing Cat. No. 107950.

## How do I install the new injector?

A customer bulletin, New Sample Acquisition Protocols (PN 400275), on installation, use, and care of the WB Injector, is available online. Adjustments to the argon gas flow are required, so read this customer bulletin carefully. In addition, the Helios User Guide has been updated with information on using the WB Injector and Maxpar Cell Acquisition Solution.

### For technical support visit [fluidigm.com/support](https://fluidigm.com/support).

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