

# Tissue Analysis and Imaging Using APMALDI(ng) UHR Ion Source with LTQ Orbitrap Velos

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## Introduction

MassTech's AP-MALDI(ng)-UHR ion source is now available for the Thermo Scientific MS systems. This note includes preliminary data and description of the AP-MALDI(ng)-UHR source for tissue analysis .

## AP-MALDI(ng) UHR Parameters

Laser Repetition Rate	: 1 kHz (10 kHz possible)
Laser Energy	: ~2-3 $\mu$ J
Spot Size (elliptic)	: ~10 $\mu$ m

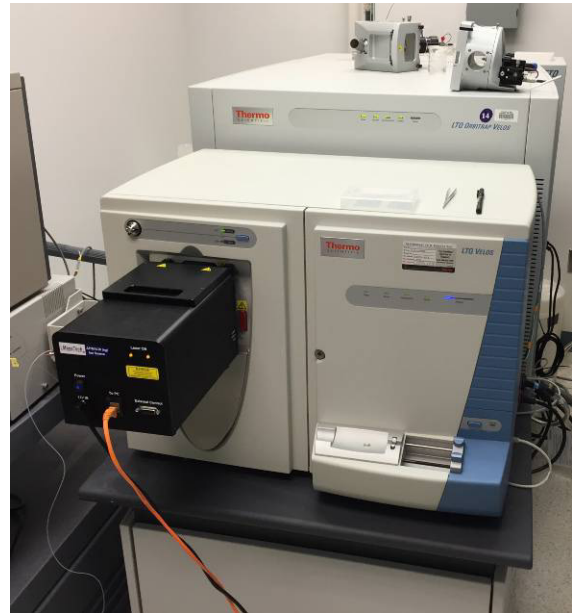
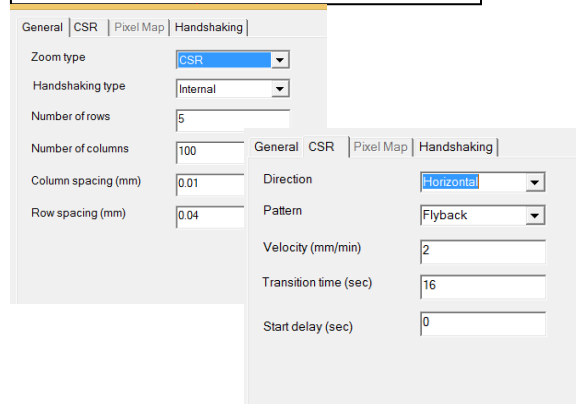


Figure 1: AP-MALDI (ng)-UHR typical Motion Parameters

Figure 2: Experimental Setup

Ion Injection Time	: 200 ms
Number of Microscans	: 3
Plate (Ion Spray) Voltage	: 2500 V
Ion Transfer Tube	: 350 $^{\circ}$ C
Scan Time	:1.15 sec/scan

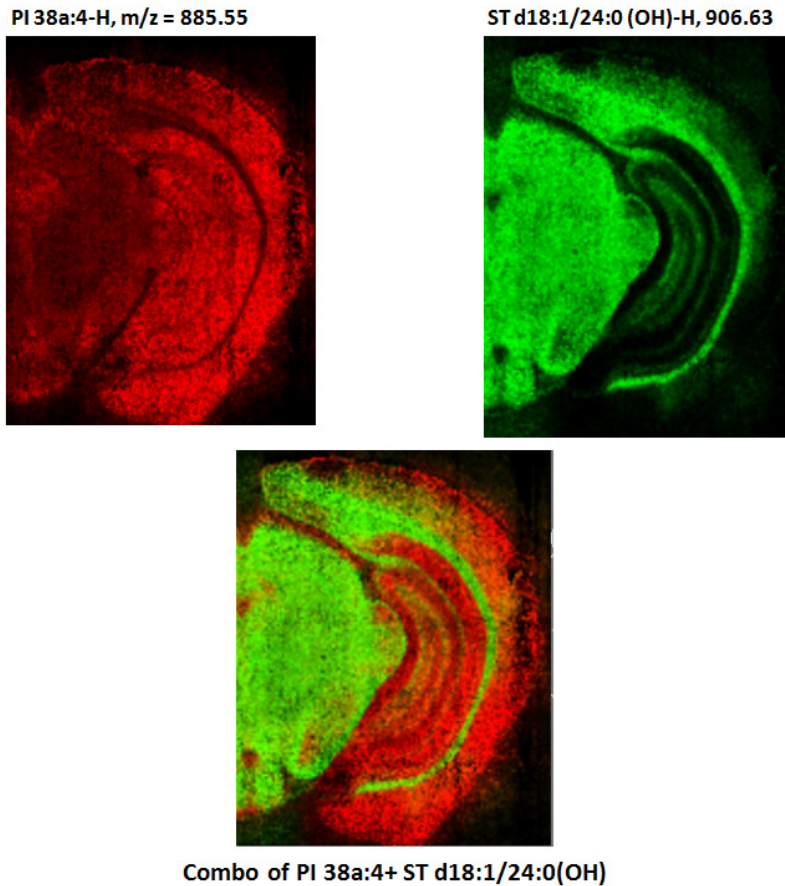
Figure 3: MS Parameters

## Tissue Analysis

Several tissue sections were analyzed at different selected pixel sizes. Examples below are from rat brain tissue sections.

A Coronal rat brain section (18  $\mu\text{m}$  thickness) was cut (Tissue Bregma -6.00 mm, Figure 83 in rat brain atlas) and MS image was obtained with LTQ Orbitrap Velos equipped with AP-MALDI(ng)-UHR . The mass spectrometer was in Negative ion mode,  $m/z$  range: 700-2000 and mass resolution was 60,000. (Figure 4)

4ml of DHA matrix solution was used with concentration of 10 mg/ml; sprayed with airbrush. Images are processed by *Thermo ImageQuest* Software.



*Figure 4: Rat brain section images of PI 38a:4-H,  $m/z = 885.55$   
and ST d18:1/24:0 (OH)-H,  $m/z = 906.63$   
Spatial Resolution = 60  $\mu\text{m}$*

Similarly, Coronal rat brain section (18  $\mu\text{m}$  thickness) was cut (Tissue Bregma -6.00 mm, Figure 83 in rat brain atlas). LTQ Orbitrap Velos was in Positive and mass resolution was

30,000. (Figure 5) 4ml of DHA matrix solution was used with concentration of 10 mg/ml It was sprayed with airbrush.

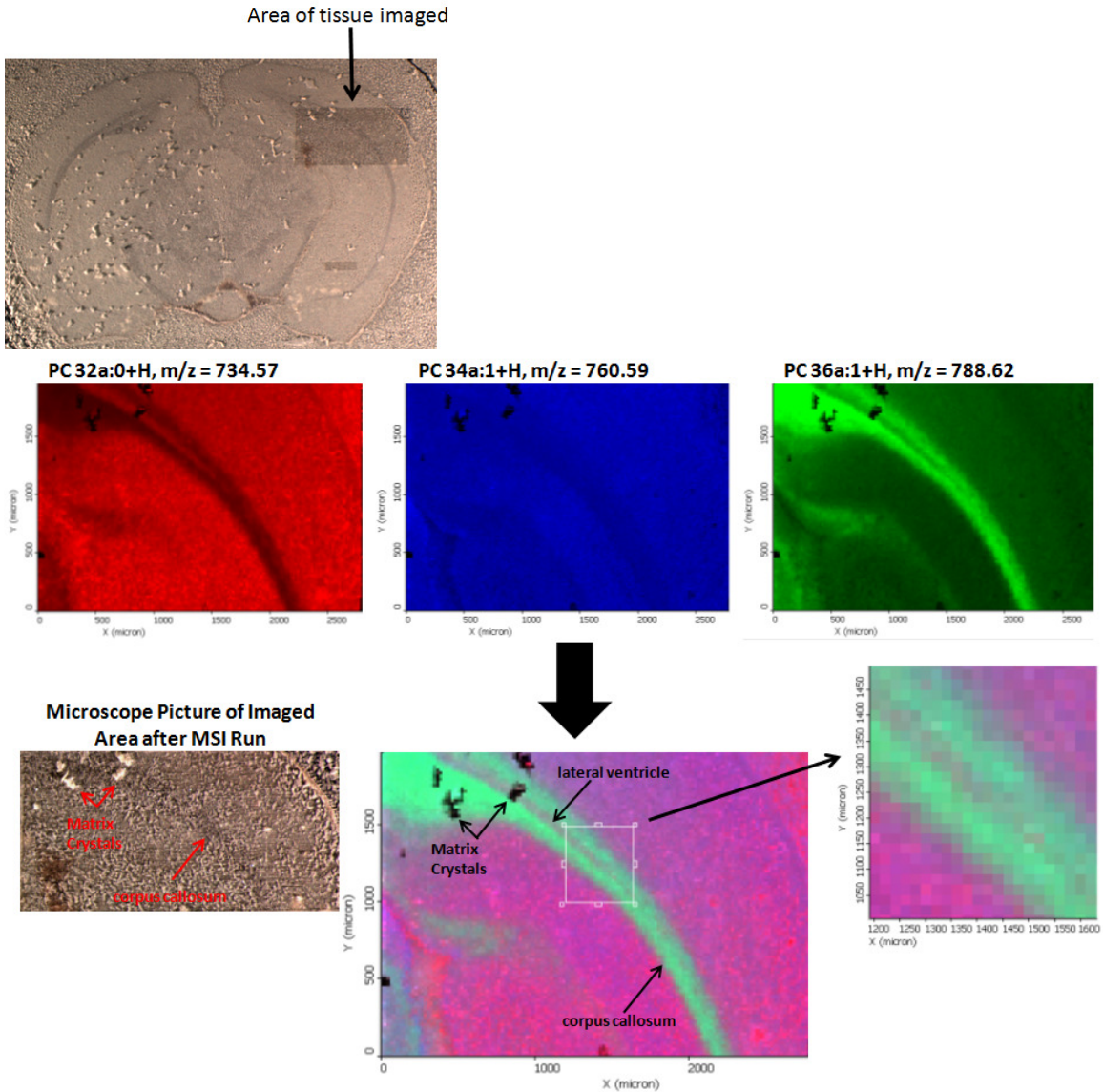


Figure 5: Rat brain section images of PC32a:0+H,  $m/z = 734.57$ , PC34a:1+H  $m/z=760.59$  and PC36a:1+H  $m/z =788.62$   
Spatial Resolution = 20  $\mu\text{m}$

### Conclusions

The LTQ Orbitrap Velos equipped with AP-MALDI(ng)-UHR ion source can provide quick as well as high resolution MS images. *Thermo ImageQuest* Software can be used as an efficient tool for smooth processing of the data.