Hair Mass Spectrometry Imaging of Daily Maraviroc Adherence in HPTN 069/ACTG 5305

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Introduction

Background:

- HPTN 069/ ACTG 5305 assessed safety and tolerability of regimens containing maraviroc (MVC) to prevent HIV Infection in at-risk MSM and women.
- Assessment of adherence included collection of patient hair strands, which can provide long-term measures of drug-taking behavior.

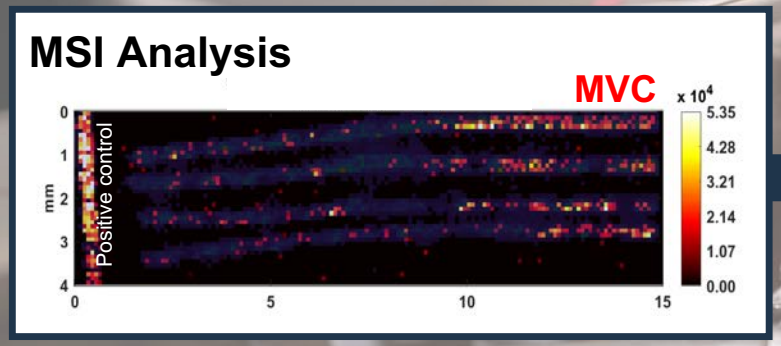
Study Objective:

- To evaluate daily MVC adherence in HPTN 069/ ACTG 5305 hair samples using infrared matrix-assisted laser desorption electrospray ionization (IR-MALDESI) mass spectrometry imaging (MSI).

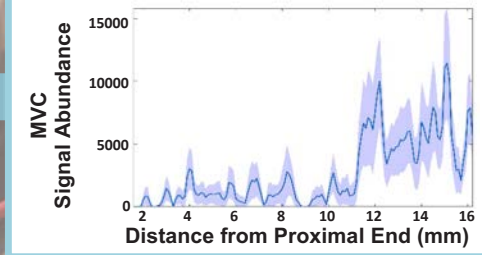
Methods

IR-MALDESI MSI

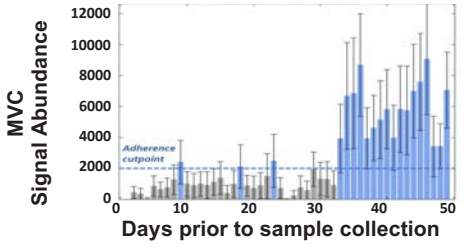
MSI Analysis



Longitudinal Profile

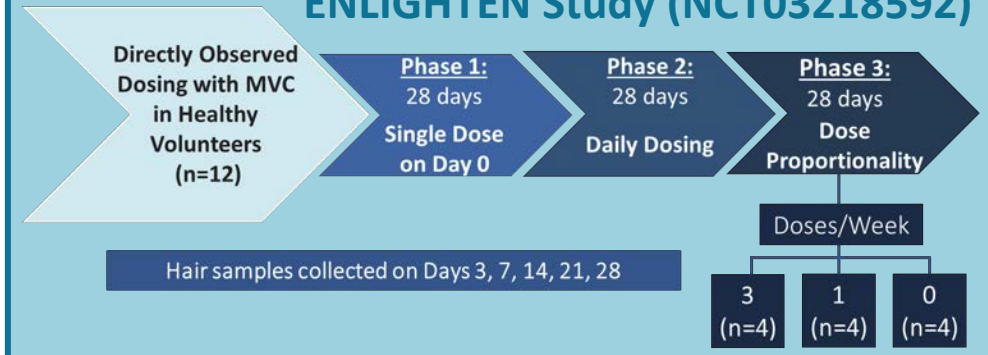


Adherence Reporting



Benchmarking MVC in Hair

ENLIGHTEN Study (NCT03218592)



HPTN 069/ACTG 5305 Adherence Classification

- MVC was measured in 32 samples from 19 individuals (10 male, 9 female), collected at Week 24, 48, or 49 study visits.
- IR-MALDESI MSI analysis was conducted over the proximal 1cm of hair strands (~1 month of growth).
- Quantitative results were compared to LC-MS/MS results from matched segment lengths.

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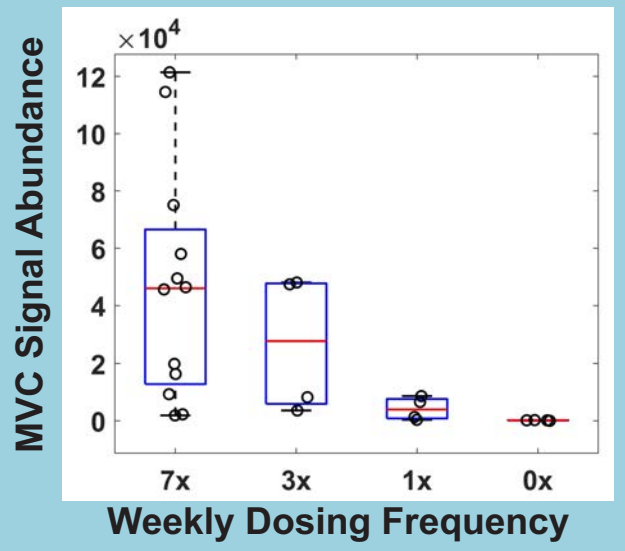
Results

Benchmarking MVC in Hair

A)



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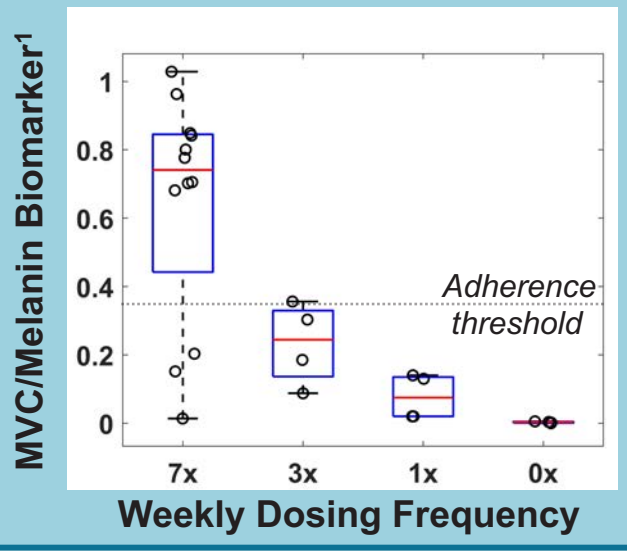
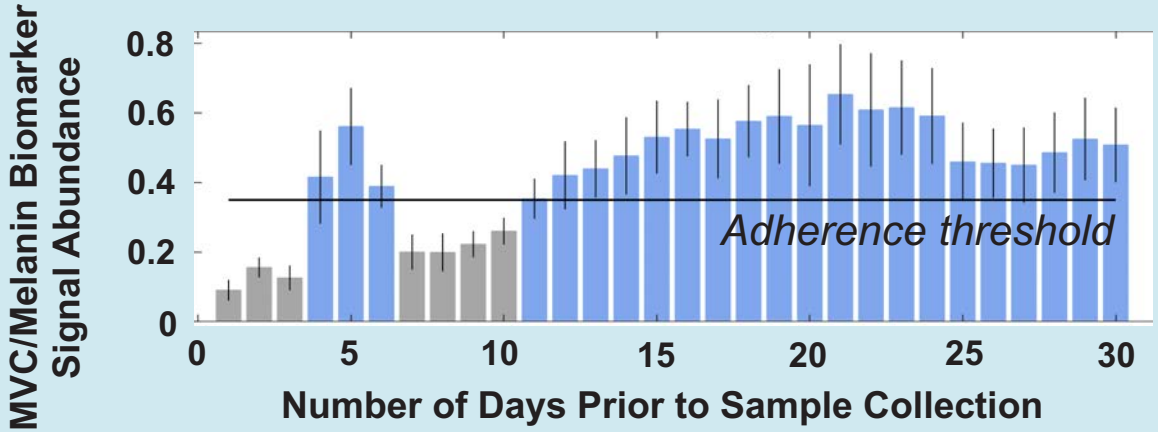


HPTN 069/ACTG 5305 Adherence Classification

C)



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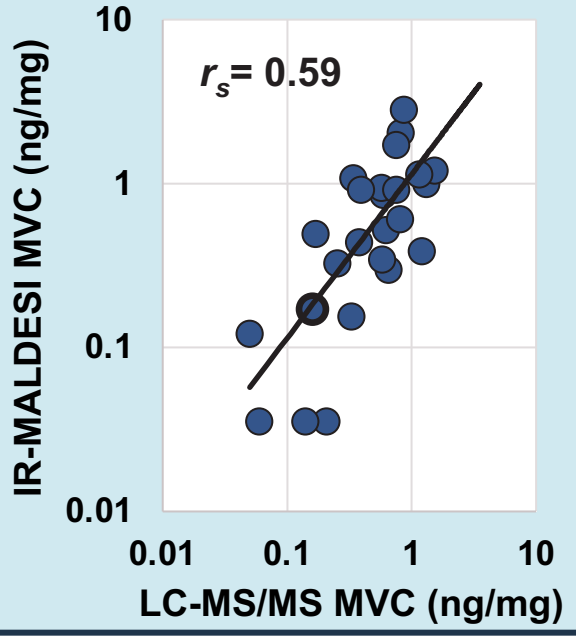

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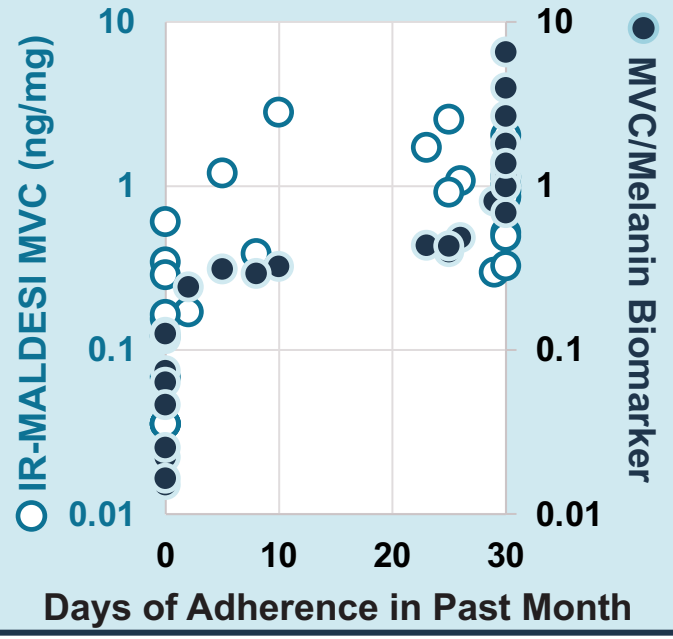

[1] Rosen et al. *Anal Chem*. 2016 88(2): 1336-1344.

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Conclusions

- Hair color is an important factor for accurate adherence classification of MVC in hair strands, and likely other antiretrovirals with similar physicochemical properties.
- Normalization of MVC hair strand concentrations by a melanin biomarker increased accuracy of adherence classification relative to MVC alone.
- Daily MVC adherence classification in HPTN 069/ ACTG 5305 hair strands indicated only 8/19 individuals adhered to a daily regimen throughout the prior month.
- IR-MALDESI MSI captures short-term changes in adherence behavior that are incorporated into the long-term accumulation of drug in hair strands.

Acknowledgments

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