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### Introduction to HIV Cure-Related Research



This research training curriculum is a collaborative project aimed at making the science of HIV cure-related research accessible to the community and the HIV research field.

### **A Whirlwind Tour**

- Why do we need an HIV cure
- Ethical challenges
- Why we believe an HIV cure is possible
- Path to a cure
- Why is curing HIV so difficult
- Cure strategies being pursued





### What Do We Mean When We Say Cure?

#### Two main cure pathways:

- **"Complete"** = HIV is completely gone from the body
- **HIV control without daily drugs** = the ability to control HIV without HIV Antiviral treatment



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### What Kind of Cure Do PWH Want?

- Safe
- Simple
- Affordable
- Scalable
- Complete
- Durable
- Prevents Transmission to and from others

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## Why do we need a cure?



People see an HIV cure as LIBER-ATING for both Individuals and society.



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Sylla L et al. What would an HIV cure mean to you? Ascribing meaning through an HIV cure tree. Poster abstract WEPEC1047, IAS 2017.

### Reasons Why We Need Optimized Treatments and a Cure for HIV

- It is not possible to get ART to the over 38 million people with HIV in the world for their entire lives
- We cannot overcome the challenges of successfully taking drugs over your entire life
- Drug resistance, toxicities over time, and stigma associated with daily ART

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### Why Do We Need an HIV Cure?



Inspired from: https://www.cryophiladelphia.com/what-is-chronic-inflammation-how-can-it-damage-your-body/



# Why do we think a cure for 500 HIV is possible?



### Why We Believe a Cure Might be Possible



Timothy Ray Brown "The Berlin Patient" March 11, 1966 - September 29, 2020



Adam Castillejo "The London Patient"



"The Dusseldorf Patient"





### The History of Our Path to a Cure



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### **HIV Cure is Rare: Examples of Elimination** and Durable ART-Free Suppression



Hutter et al., N Engl J Med 2010; Gupta et al., Nature 2019; Gupta et al, Lancet HIV 2019; Jiang et al., Nature 2020

SLIDE CREDIT: Sharon Lewin, Singapore AIDS Conference 2020









## Why is it difficult to cure HIV?

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### Where is the HIV Reservoir?

- Brain
- Lymph nodes
- Peripheral blood
- Gut
- Bone marrow
- Genital tract



Chaillon A, Gianella S, Dellicour S, Rawlings SA, Schlug TE, De Oliveira MF, et al. HIV Persists Throughout Deep Tissues with Repopulation from Multiple Anatomical Compartments. *Journal of Clinical Investigation* 2020.





## What pathways are currently being explored?



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### **Block and Lock-Deeper Latency**

Block the reading of the HIV DNA



Lock the HIV DNA from ever being read

Latency

https://www.labroots.com/trending/health-and-medicine/7121/scientists-discover-block-and-lock-drug-cure-hiv https://kirby.unsw.edu.au/news/block-lock-pathway-hiv-remission



### े ACKNOWLEDGMENTS









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