Immune response to mpox in PWH and Prep users after infection, but not in response to vaccination

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440

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BACKGROUND AND OBJECTIVE

- In May 2022, WHO considered the outbreak of mpox infection as a public health emergency of international concern (PHEIC).
- Vaccination was recommended for people with HIV (PWH) and users of pre-exposure prophylaxis (PrEP).
- The need to vaccinate the population at risk worldwide, mainly PWH and PrEP users has increased.
- **Objective:** To analyze the immune response generated after mpox infection compared to vaccination with Imvanex® or Jynneos®.

PARTICIPANTS & METHODS

- People infected with mpox a median of 8.6 months before blood sample collection (mpox+)(n=31), people vaccinated against mpox (n=13 one dose; n=11 two doses), and people non-exposed to mpox or smallpox (n=38) were recruited (**Table 1**).
- Participants were PWH (n=40) and PrEP users (n=53).
- MHC-I and –II restricted mpox-related (vaccinia) peptide pools (PepPools, Mabtech).

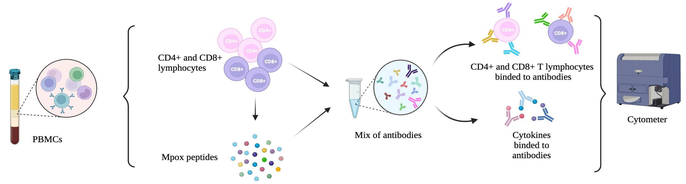


Table 1. Sociodemographic and clinical data of all participants in the study.

	Non-exposed (n=38)	1-dose Vaccinated (n=13)	2-doses Vaccinated (n=11)	MPXV-infected (n=31)
Age, median (IQR)	34 (27-46)	34 (32-40)	38 (35-41)	37 (34-47)
Male gender, n (%)	38 (100)	13 (100)	11 (100)	31 (100)
HIV-1 infection, n (%)	11 (28.9)	3 (23.1)	1 (9.1)	25 (80.6)
Time of HIV-1 infection (years), median (IQR)	5 (3-7)	8.5 (8-9)	Unk.	10 (6-11)
Ratio CD4/CD8, median (IQR) in PWH	0.7 (0.6-1.1)	0.8 (0.6-1)	1.1 (1.1)	1 (0.6-1.8)
PrEP users	27 (71.1)	10 (76.9)	10 (90.9)	13 (41.9)
Previous mpox infection, n (%)	0 (0)	0 (0)	0 (0)	31 (100)
Time from mpox infection to sample (days, median (IQR)	NA	NA	NA	258 (254-285)
Vaccination against Orthopoxvirus, n (%)	0 (0)	13 (100)	11 (100)	1 (3.2)
Time from mpox vaccination to sample (days, median (IQR)	0 (0)	338.5 (288-349)	126 (72-169)	147.5 (107-188)

CONCLUSIONS

- PWH and PrEP users infected with mpox showed a potent and long-lasting immune response to poxvirus peptides.
- Vaccination against mpox with Imvanex® or Jynneos® did not produce significant changes in the capacity to response to vaccinia peptides compared to those not previously exposed to the virus.

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The most potent and robust T-cell responses against poxvirus were developed after mpox infection, while they were barely detectable after vaccination.

RESULTS

Figure 1

- **A**: Mpox-infected cohort showed CD4+ T-cell lymphopenia compared to 1-dose Vaccinated (-1.5-fold, p=0.0114) and Mpox-non-exposed (-1.3-fold, p=0.0479) cohorts.
- **B**: Stimulated CD4+ T cells from Mpox-infected cohort also showed higher capacity to produce IL-2 than 2-doses Vaccinated (1.8-fold; p=0.0328) and Mpox-non-exposed (1.4-fold, p=0.0279) cohorts.

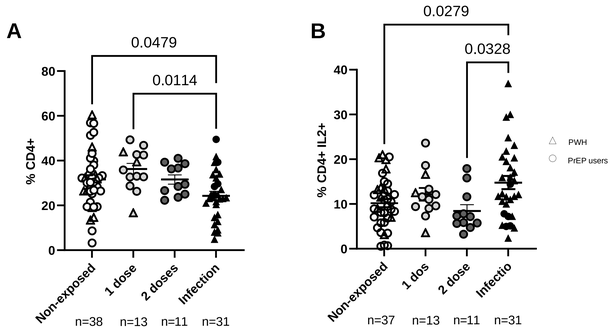


Figure 2:

- **A**: Mpox-infected CD4+ TN cells showed higher expression of CD25 on the surface (1.9-fold, p=0.0479, compared to Mpox-non-exposed), as well as increased capacity to produce IFNγ (2.5-fold, p=0.0247, compared to 2-doses Vaccinated).
- **B**: People from Mpox-infected cohort showed higher levels of CD4+ TCM cells than the other cohorts (2-dose Vaccinated: 3.1-fold, p=0.0118 and Mpox-non-exposed: 2.0-fold, p=0.0183).

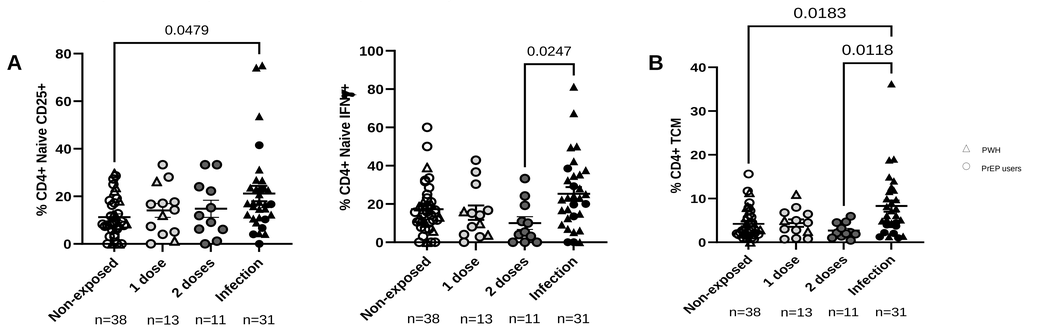


Figure 3:

CD8+ T cells from Mpox-infected cohort produced higher levels of cytokines in response to poxvirus peptide pool:

- **A**: IFNγ (1.6-fold, p=0.0321, compared to 1-dose Vaccinated cohort; 1.7-fold, p=0.0296, compared to 2-doses Vaccinated cohort; and 1.6-fold, p=0.0056, compared to Mpox-non-exposed cohort).
- **B**: TNFα (2.1-fold, p=0.0084, compared to 1-dose Vaccinated cohort).

