

BREACH
BELGIAN RESEARCH **AIDS&HIV** CONSORTIUM



Best Poster Contest

15 Posters

- 2 Basic Science
- 4 Clinical Science
- 9 Public Health



Introduction

The advent of near full-length HIV-1 provirus sequencing has greatly expanded our understanding of the HIV-1 reservoir, revealing that 2-5% of the genome-intact in ART-treated individuals can be considered as putatively intact. However, these studies are labor-intensive and based on dilution, limiting their scalability. We developed a long-read sequencing assay to characterize many

Methods

The long-read sequencing assay was performed on 15 chronic ART-suppressed individuals using a fixed input of 500 ng DNA extracted from peripheral blood CD4 T cells (reservoir sizes ranging from 321 to 6581 total HIV-1 DNA cp/Mio CD4 T cells). Individual proviruses were tagged with a different unique molecular identifier (UMI) at each end during a single reaction, followed by NFL PCR amplification and long-read sequencing on an Oxford Nanopore MinION (Figure 1B). UMI-based deconvolution allowed for the construction of highly accurate consensus genomes, excluding aberrant chimeric PCR artefacts. In addition, we performed Individual Provirus Sequencing (FLIPS) was performed on 2 individuals (Figure 1A). Data from both assays were compared through phylogenetic analyses.

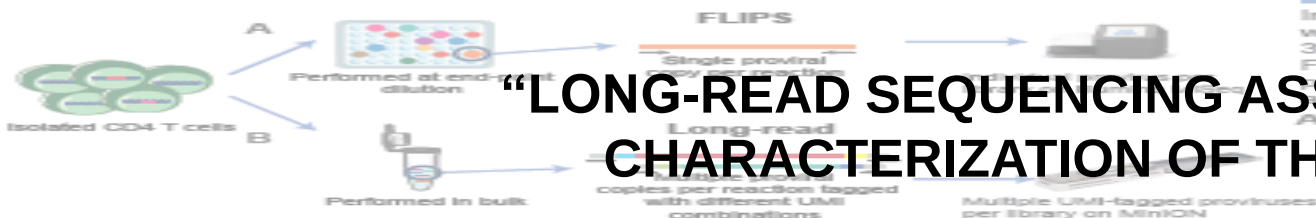


Figure 1: Schematic overview of the used assays. In A) the workflow of the gold standard full-length individual provirus sequencing (FLIPS) assay relying on limiting dilution is depicted while B) shows the long-read assay relying on unique molecular identifiers (UMI).

Results

Assay can be used on diverse reservoir sizes

The long-read assay could successfully be applied on our cohort and yielded an average of 14 distinct HIV-1 proviruses per participant (range: 3-42). Note that some participants (eg. 1 and 11), despite having a large reservoir, yielded only 3 different proviruses which could be due to the presence of large infected cell clones sharing the same provirus.

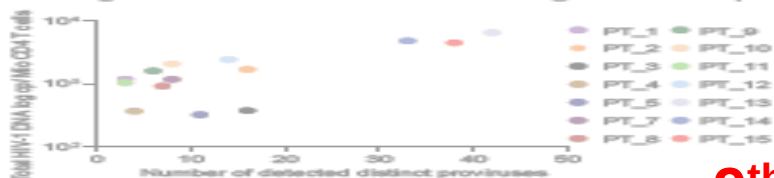


Figure 2: Reservoir size and number of distinct proviruses recovered using the long-read assay for each participant.

Allows for HIV-1 genome classification

Across all participants, 213 distinct proviruses were retrieved of which 8% were considered as putatively intact.



Figure 3: Classification of the HIV-1 genomes acquired with the long-read assay.

Overall agreement on observed proviral reservoir

In Participant 14, who displayed limited clonality (2/35 FLIPS genomes were clonal), only 1 overlapping provirus was found. While an overlap of 3 proviruses was observed in Participant 15 with higher clonality (33 of 36 FLIPS genomes were clonal). Comparing the 4 overlapping consensus genomes with the 4 overlapping FLIPS counterparts showed an

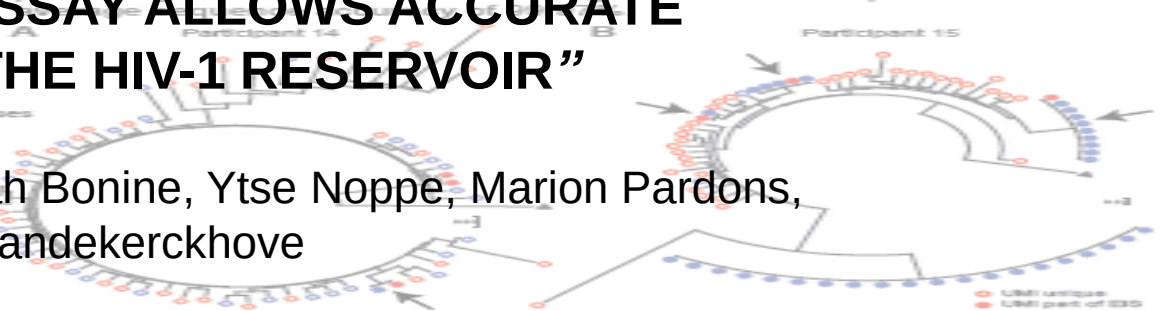


Figure 4: Phylogenetic analysis by Maximum Likelihood Trees. Trees included for Participant 14 and Participant 15. Genomes part of an expansion of identical sequences (EIS) are represented by filled circles. Arrows indicate matches of identical proviruses between the FLIPS and long-read assays.

Conclusions

The long-read assay offers a new NFL sequencing method which enables an accurate characterization of the proviral landscape in a more efficient way than current widely used NFL techniques.



BEST POSTER

Basic Science

“LONG-READ SEQUENCING ASSAY ALLOWS ACCURATE CHARACTERIZATION OF THE HIV-1 RESERVOIR”

Laurens Lambrechts, Rita Verstraeten, Noah Bonine, Ytse Noppe, Marion Pardons, Basiel Cole, Linos Vandekerckhove

BEST POSTER

Clinical Science

“EVOLUTION OF SEVERE OBESITY AND ASSOCIATED-COMORBIDITIES IN HIV-POSITIVE PATIENTS WITH AND WITHOUT BARIATRIC SURGERY: A CASE-CONTROL STUDY”

Victoria De Wit, Marc Delforge, Guy-Bernard Cadière, Stephane De Wit and Deborah Konopnicki

- Purpose:** Obesity and related-comorbidities are increasing in PLWH. Bariatric surgery (BS) is a safe and effective procedure in the general population but its use is limited in PLWH. This study compares the evolution of severe obesity and associated comorbidities in PLWH with or without BS.
- Methods:** Retrospective case-control study in PLWH and followed at Saint-Pierre University Hospital, with body mass index (BMI) ≥ 40 or ≥ 35 kg/m² with at least one comorbidity (diabetes, hypertension, sleep apnea syndrome, dyslipidemia); cases (n=27) underwent BS between 2006-2019; Controls (n=73) were PLWH matched (1 case/3 controls) on age, gender, ethnicity and BMI. Clinical and biological parameters were collected at 1, 2, 5 and 10 years follow up (FU) after BS.
- Results:**

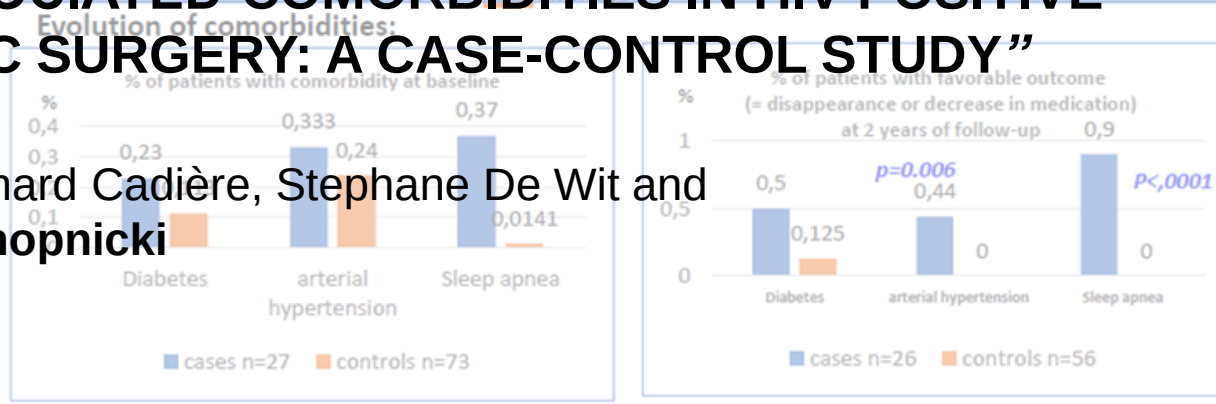


BMI ≥ 40
or
BMI ≥ 35 + comorbidity(ies)

- 13 gastric bypass (GB)
- 13 sleeve gastrectomy (SG)
- 1 gastric banding

Baseline characteristics	Cases (n=27)	Controls (n=73)	ns
Median age (years)	42.2	44.4	NA (not applicable)
Female sex	85.2%	83.6%	ns
Sub Saharan African origine	77.8%	78%	ns
HIV heterosexually acquired	77.8%	85%	ns
HIV median CD4 count (IQR) (cells/ μ L)	646 (455-862)	704 (460.5-900.5)	ns
Under cART (%)	92.6%	91%	ns
Cumulative time with HIVRNA <50 cp/ml (IQR) (years)	6.7 (3.8-11.1)	5.7 (2.7-10.3)	ns
Weight (IQR) (kg)	112 (100-135)	100 (96-114)	0.0042
BMI (IQR) kg/m ²	41.1 (37.8-45.4)	37.3 (36.4-39)	0.0017
BMI ≥ 40 kg/m ² (%)	63%	19.2%	0.0004

- Major Surgery complications rate was 11% and 2 cases needed a second BS because of weight regain, similarly to what is described in the literature in the general population.
- GB led to greater loss of excess weight than SG at 2 years (respectively 89.3% vs 90.8% in excess weight).



- HIVRNA suppression was maintained in all but 1 patient with transient dysphagia after SG; after switching cART for a smaller pill, HIVRNA became undetectable again
- Exposure to different cART that could have impact on weight (Tenofovir disoproxil or alafenamide/Integrase Inhibitors/Rilpivirine) was similar in cases and controls both at baseline and during follow up.
- Bariatric surgery among PLWH is safe and effective both on severe obesity and related comorbidities with no impact on viral suppression.



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Jef Vanhamel¹, Thijs Reyniers¹, Edwin Wouters², Christiana Nöstlinger¹, Josefiën van Olmen³, Thibaut Vanbaelen⁴, Heleen Van Mieghem¹, Ella Van Landeghem¹, Anke Rotsaert¹, Marie-Louise Laga¹ and Bea Vuylsteke¹
¹Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium; ²Department of Sociology, University of Antwerp, Antwerp, Belgium; ³Department of Family Medicine and Population Health, University of Antwerp, Antwerp, Belgium; ⁴Department of Clinical Sciences, Institute of Tropical Medicine, Antwerp, Belgium



Background & objective

- In Belgium, PrEP delivery is currently limited to specialized HIV Reference Centres (HIV-RCs).
- Primary care practitioners, such as family physicians (FPs), currently have no formal role in the provision of PrEP.
- Engaging FPs in PrEP care could help to scale up PrEP delivery and improve access for currently underserved groups.
- **Objective:** to gain an in-depth understanding of FPs' self-perceived roles in providing PrEP, and to explore opportunities to increase their engagement in PrEP care.

Methods

Participants: Flemish FPs, who meet regularly in local groups for continuous medical education (CME), took part in an online group discussion (Q&A) on PrEP. Between November 2020 and February 2021, we conducted an online Q&A discussion in a virtual room with a total of 105 participants. FPs first completed an online questionnaire on their socio-demographics and relevant information on their practice and PrEP. Data were then analyzed using a grounded theory approach.

Results

Four general FP roles emerged from the data, which FPs found to be compatible with several aspects of PrEP care (see figure). Perceived barriers to taking up these roles in daily practice were also identified:

- **Advice & education:** FPs saw the opportunity of being the first point of contact for questions on sexual health and PrEP. However, limited awareness and knowledge of PrEP were reported as main barriers.
- **Identifying prevention opportunities:** FPs acknowledged their preventive role, yet they preferred opportunistic case finding over systematic screening for PrEP eligibility. A perceived low exposure to clients at high HIV risk, and a lack of clients' mandate to talk about sex were main barriers.
- **Initiating care:** Since FPs are often entry points to care, they perceived referral of PrEP-eligible clients to specialist services as their minimal role. Some FPs would start clients on PrEP themselves. Main barriers to self-initiation were limited knowledge of PrEP, lack of time, and the need for counseling.
- **Coordinating care:** This fitted FPs' commitment to person-centered care. Here, PrEP presented an opportunity to gain more insight in clients' sexual health, adding value to their holistic approach. The perceived low complexity of delivering clinical care for PrEP added to the feasibility of taking up this role, provided that clear guidelines for integrating PrEP in primary care are available.



- 16 online GDs in 4 out of the 5 provinces of the Flemish region.
- Participants were from a mix of rural, semi-urban and urban practices.
- 95% of participants (95%) had no previous experience with PrEP.
- Almost half (44%) of all participants had already received questions from clients about PrEP.

"I think we do need to know more about what this [PrEP] is about. We need to be able to give information if clients ask for it. We need to have a more positive position about this, and present available options"

Jef Vanhamel, Thijs Reyniers, Edwin Wouters, Christiana Nöstlinger, Josefiën van Olmen, Thibaut Vanbaelen, Heleen Van Mieghem, Ella Van Landeghem, Anke Rotsaert, Marie-Louise Laga and Bea Vuylsteke

"I think it can be an advantage that we know the patient better. We know more about their history. We can keep oversight, and keep track of the tests that have been done or still need to be done."

Ensure follow-up of clients on PrEP

Coordinate care

Initiate appropriate care

Start-up PrEP or navigate towards specialist services

"I would really like to learn some more about PrEP to be more comfortable, before prescribing it. [...] On the other hand, it would lower the threshold [for clients] if we [FPs] could prescribe it as well."

Discussion and conclusion

- Despite limited awareness and knowledge of PrEP, FPs in Belgium are already involved in several aspects of PrEP care, congruent with their role as primary care providers.
- Expert-led interactive training sessions together with FP-relevant PrEP guidelines are valuable tools towards successfully integrating PrEP in primary care.
- A clear division of roles and responsibilities to support the different phases of PrEP ('follow-up'), is a prerequisite for a successful collaboration model of PrEP delivery in Belgium.

9th BREACH SYMPOSIUM
November 30th, 2021, Dolce



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