

HIV-1 DNA Testing Identifies Drug Resistance in Viremic Patients With Pan-Sensitive Plasma Virus

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I. Background

- Patients who discontinue antiretroviral therapy (ART) often present with wild-type plasma virus due to gradual loss of drug resistance mutations (DRMs) in the absence of selective drug pressure^{1,2}
- Past drug resistance can emerge upon resumption of therapy, hinder virologic suppression, and jeopardize future treatment options³
- HIV-1 DRMs are archived within latently infected peripheral blood mononuclear cells (PBMCs) and can be identified using HIV-1 DNA drug resistance testing⁴

II. Methods

- Plasma virus and PBMC samples were collected on the same day from patients with viremia
- HIV-1 drug resistance was assessed using PhenoSense GT® Plus Integrase on plasma virus and GenoSure Archive® on PBMC samples (Monogram Biosciences)
- Plasma virus with genotypic sensitivity to all antiretrovirals (ARVs) was identified and test results compared to the paired PBMC test
- “Resistance” and “resistance possible” assessments on test reports were scored as resistant to drug
- The impact of viral load on resistance detection was assessed using Mann-Whitney U and Pearson correlation

III. Results

Table 1. Patient and virus characteristics

| Characteristic | n (% or range) |
|--|---------------------------|
| Total test pairs | 66 |
| Unique patients | 64 |
| Female | 59 (92%) |
| Mean age, years | 36.6 (18.8 - 56.7) |
| HIV-1 Subtype | |
| B | 60 (93.8%) |
| C | 1 (1.6%) |
| D | 1 (1.6%) |
| G | 1 (1.6%) |
| AG | 1 (1.6%) |
| Mean viral load at resistance testing, copies/mL | 109,618 (150 - 1,470,000) |

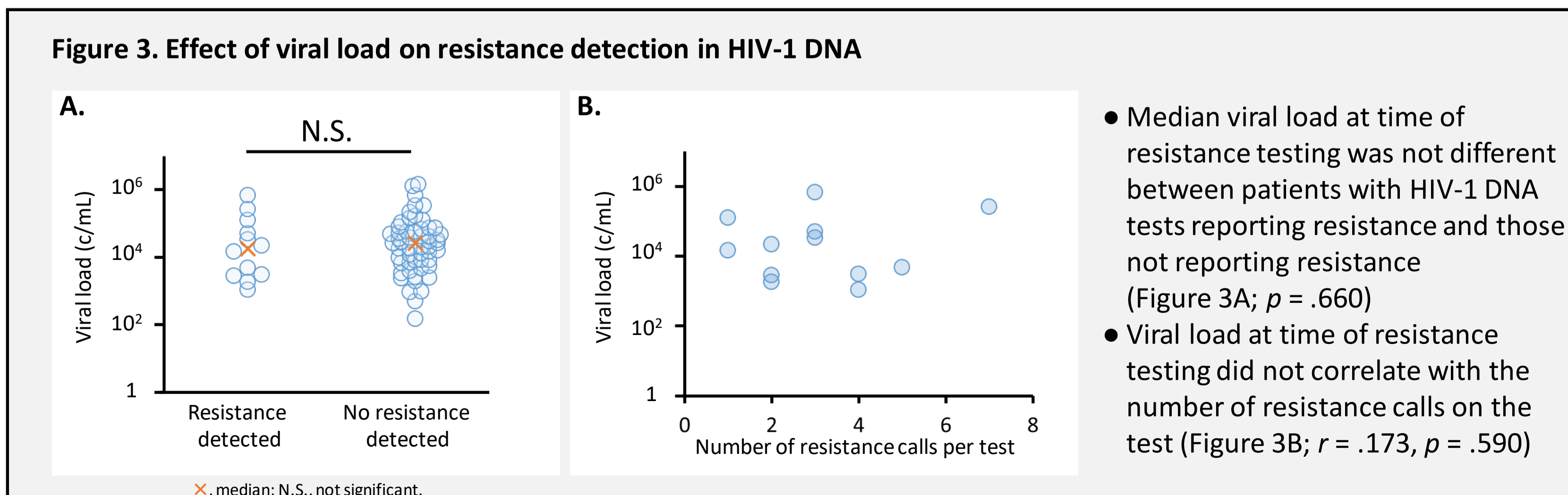
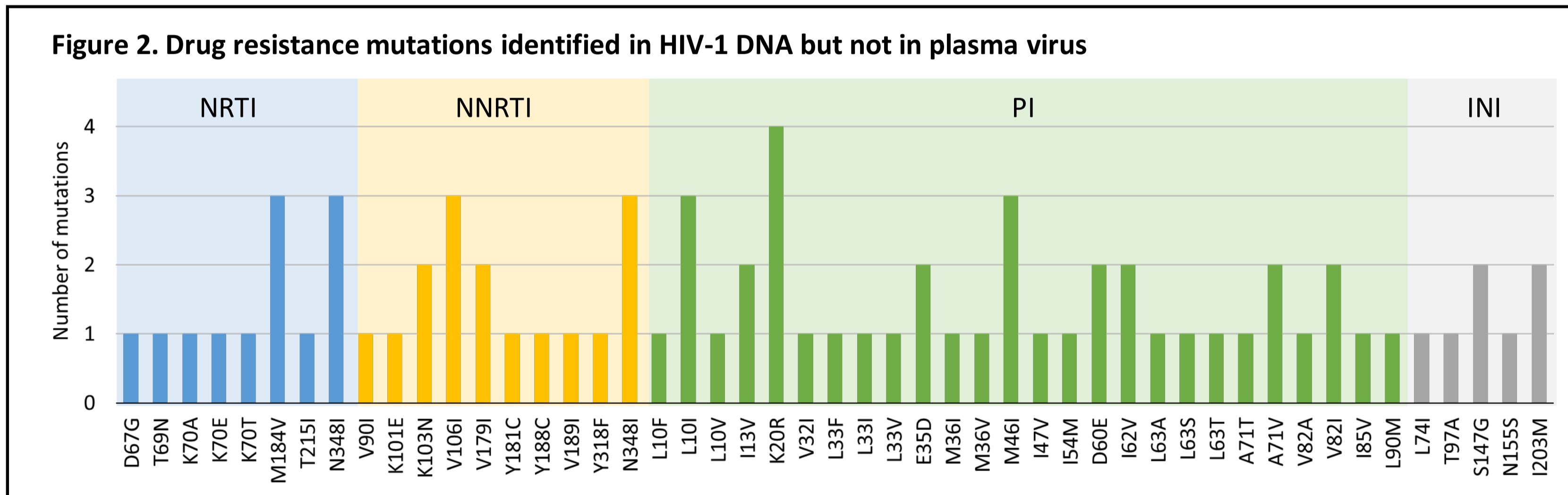
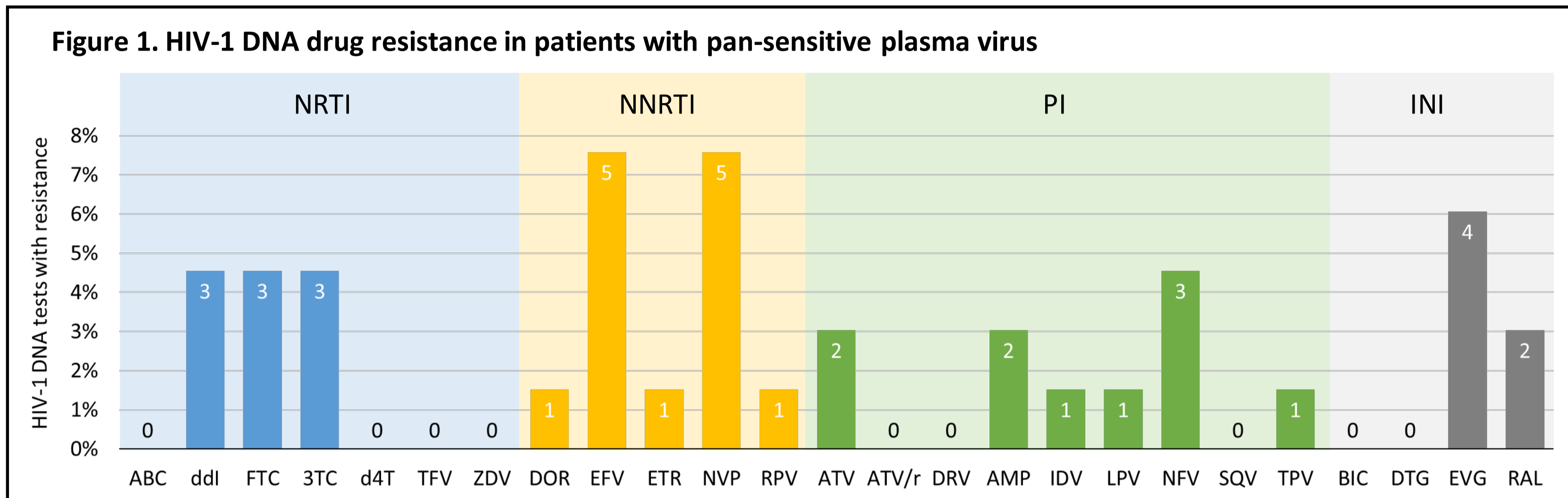


Table 2. Drug resistance characteristics

| Characteristic | n (%) |
|-------------------------------|-------------|
| HIV-1 DNA resistance detected | 13/66 (20%) |
| NRTI | 3 (4.5%) |
| NNRTI | 6 (9.0%) |
| PI | 3 (4.5%) |
| INI | 4 (6.0%) |
| 2-class resistance | 3 (4.5%) |
| 1-class resistance | 10 (15.0%) |
| DRMs detected* | |
| Plasma virus total | 179 |
| Unique to plasma virus | 5 |
| HIV-1 DNA total | 260 |
| Unique to HIV-1 DNA | 72 |

DRM, drug resistance mutation; INI, integrase inhibitor; NRTI, nucleos(t)ide reverse transcriptase inhibitor; NNRTI, non-nucleoside reverse transcriptase inhibitor; PI, protease inhibitor.
 *DRMs affecting both NRTI and NNRTI susceptibility were counted only once.

IV. Summary and Conclusion

- HIV-1 DNA testing identified drug resistance in 20% of cases when plasma virus demonstrated pan-sensitivity (Figures 1 and 2, Table 2)
- In viremic patients with pan-sensitive plasma virus, HIV-1 DNA testing can identify drug resistance regardless of viral load level at time of testing (Figure 3)
- Assessment of drug resistance in HIV-1 DNA may be useful in designing suppressive ARV regimens for patients whose plasma virus reverts to wild-type due to lack of treatment adherence and/or continuity of care

V. References

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VI. Acknowledgements

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