EIA showing similar sensitivity to fourth generation EIA (100%) and higher specificity (97.5 versus 95.1%).[5] In our study we were unable to identify any individual who was truly positive only by a fourth generation assay. Based on our findings we believe that any sample which shows an S/CO of <7 may be a false positive result by the Abbot AxSYM system and can be declared negative by testing with two other fourth/third generation assays. However, any sample with >7 S/CO should be considered as positive and if there is any discrepancy with other fourth generation assays it should be sent for molecular assay for the detection of HIV RNA.

References


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An Explanation in Nanostructure Level Based on the View of Energy Change for G333d Mutation Relating to Drug Resistance in HIV-1 Reverse Transcriptase

Dear editor,

Human immunodeficiency virus (HIV) infection is an important infection affecting a million of world population. The best present way in coping with the patients with HIV is controlling of disease with antiretroviral drugs. However, a new emerging problem of antiretroviral drug usage is the problem of drug resistance. Standardised surveillance of transmitted and treatment-associated HIV drug resistance is critical to the success of antiretroviral therapy expansion in developing countries.[1] DNA polymerase and RNAse H activities of HIV reverse transcriptase (RT) have been recognized as potential targets for antiretroviral therapy for many years.[1] The development of medicines targeting the DNA polymerase activity has been highly successful, with currently more than ten drugs approved for the treatment of HIV infection and more candidates in preclinical and clinical development.[2] However, the drug resistance due to the mutation of HIV-RT becomes a new interesting problem in HIV medicine. Mutations at G333D mutation within the reverse transcriptase (RT) gene cause resistance to both zidovudine (AZT) and lamivudine (3TC) in a background of mutations associated with loss of sensitivity to both drugs.[3] HIV strains containing both reverse transcriptase (RT) mutations are resistant to all of the approved NNRTI drugs.[3] In this work, the author simulated for the required energy corresponding to the G333D mutation of HIV-RT. This study can give an explanation in nanostructure level based on the view of energy change.

This is a calculation-based study. The quantum chemical analysis for overall reaction was performed according to the classical bonding theory.[3] Basically, each chemical reaction possesses its specific reaction energy. The primary assumption in this study is that the required reaction energy for the pharmacological reaction between antiretroviral drug and HIV-RT is equal to “A” kCal/mol for one mole of resultant complex. This parameter is a constant parameter. The net energy requirement in kCal for a reaction depends on the amount of two substrates, one mole of antiretroviral drug and one mole of HIV-RT. Here, another primary assumption is the amount of the two substrates is equal to “B” g and “C” g for antiretroviral drug and HIV-RT in general reaction with wild type of HIV-RT. However, the significant change in the mutants of HIV-RT is the amino acid, which disturbs the amount of the substrate HIV-RT. In this work, the theoretical simulation for the two mutants was performed. Calculation for the amount of HIV-RT in G333D mutation was done. Further calculation for the net energy requirement for a reaction was performed. For the G333D mutation, the main change is Gly (weight = 75.07 g/mol) to Asp (weight = 133.10 g/mol). The change in molecular weight due to this mutant and its corresponding net energy requirement are calculated and presented in the Table. The net energy requirements of G333D mutation is less than wild type.
For G333D mutation, Zelina et al., reported that G333D increased the ability of HIV-1 RT to effectively discriminate between the normal substrate dCTP and 3TC-triphosphate and G333D also enhanced the ability of RT containing TAMs and M184V to bind template/primer terminated by AZT-monophosphate, thereby restoring ATP-mediated excision of AZT-MP under steady-state assay conditions. In this theoretical research, the author tried to explain the energy change corresponding to the G333D mutation within HIV-RT. Here, the author found that both mutants critically affect the net energy requirement. Decreased energy requirement can be observed. It should be mentioned that not only the quantum energy change but also the conformational change due to mutation can be expected. These two phenomena bring the difficulties for occurrence of reaction and further imply the drug resistance. The results from this study can be useful for antiretroviral drug design and coping with the problem of G333D mutation HIV-RT-related drug resistance. This study can be a good model for further study in this area. The author suggests further studies on other mutants of HIV-RT and their effects on drug resistance.

### References


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### Table: Change in amount of HIV-RT and net energy requirement for G333D mutation

<table>
<thead>
<tr>
<th>HIV-RT types</th>
<th>Amount (g)</th>
<th>Net energy requirement* (kCal/mol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G333D mutation</td>
<td>C - 75.07 + 133.10</td>
<td>A/C + 58.03</td>
</tr>
</tbody>
</table>

*Compared to one mole of substrate HIV-RT

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**Microscopy for Cryptosporidiosis Screening in Remote Areas**

Dear editor,

*Cryptosporidium parvum* has been responsible for numerous outbreaks of diarrhoeal diseases.[1,2] In immunocompetent host, the disease is self-limiting but in immunocompromised individual, the disease can become chronic and debilitating. With the increasing number of individuals with HIV/AIDS, cancer patients and malnourished children suffering from diarrhoeal illness, need for an easy, cheap and quick method of diagnosis is required to reduce morbidity. Though ELISA has been widely used as a diagnostic tool, availability of this facility is still poor in peripheral set-up. In this backdrop we wanted to evaluate microscopy vis-à-vis ELISA in screening stool samples for cryptosporidia in remote areas.

Faecal specimens were collected from immunocompromised (n = 72) and healthy individuals (n = 20) attending the outpatient department or in the wards of Medicine, Paediatrics and Haematology of Gauhati Medical College. All the patients had acute or chronic diarrhoeal illness. Specimens were processed by standard protocol[3] while ELISA was performed using the commercially available kit (RIDASCREEN Cryptosporidium R-Biopharm Ag, Darmstadt, Germany).

*Cryptosporidium* spp. was detected in 11 out of 72 stool specimen by microscopy; while four specimens showed positivity by ELISA. The other parasites isolated are shown in the table. The sensitivity and specificity of ELISA in detection of Cryptosporidial coproantigen was 36.4 and 100% respectively while the negative predictive value (NPV) and positive predictive value (PPV) for the same was 89.7 and 100% respectively.

In our study, we found microscopy more efficacious than performing ELISA in terms of time, equipment and cost for routine diagnosis in remote setup. Modified Z-N