Comparison of Two Multiplex Molecular Assays for the Detection of Herpes Simplex 1 and 2 and Varicella Zoster Virus

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Abstract
Background: Both Herpes simplex 1 and 2 (HSV1, HSV2) and Varicella zoster virus (VZV) cause vesicular lesions, with indistinguishable cytologic and histopathologic findings. Multiplexed rapid cycle PCR assays that detect and differentiate HSV1, HSV2 and VZV have been developed. We compare two of these assays with the traditional methods of direct immunofluorescence (DFA) for VZV and ELVIS® HSV ID Test System for HSV used in our clinical lab.

Methods: We studied 95 specimens that were submitted for HSV detection using ELVIS and 93 specimens that were submitted for VZV DFA by both the ARIES® HSV1, HSV 2/V2 Assay (RUO) (ARIES) (Luminex Corp, Austin, TX) and the Solana HSV 1+2/V2 Assay (Solana) (Quidel Corp, San Diego, CA). Specimens were considered to contain either HSV or VZV if ≥ 2 of the assays were positive. Single positives were considered false positives.

Results: The sensitivity and specificity of these assays for the detection of HSV was as follows, respectively: ELVIS (75%; 96.6%), Solana (100%; 100%), and ARIES (97.2%; 93.2%). One of the specimens yielded an “Invalid” result with the Solana assay. Significantly, 8.4-9.5% (i.e. 8-9/95) of the specimens that were submitted for HSV testing contained VZV (i.e. 8 were positive for VZV by both PCR methods; 1 was positive for VZV by only one method). The sensitivity and specificity of these assays for the detection of VZV was as follows: VZV DFA (71.4%; 100%); Solana (100%; 94.1%), and ARIES (97.6%; 100%). Significantly, 18.3-20.4% (i.e. 17-19/93) of the specimens submitted for VZV contained HSV (i.e. 17 were positive for HSV by both PCR methods; 1 was positive for HSV by ARIES and 1 was positive by Solana).

Conclusion: Both of the multiplex HSV/VZV PCR assays significantly outperformed the traditional methods for the detection of HSV1, HSV-2 and VZV. Migration from these traditional methods to PCR-based assays should be considered, given the superior sensitivity of these latter assays. Finally, combination assays that detect and differentiate both HSV and VZV should be considered, given that 8.5-9.5% of the specimens submitted for HSV contained VZV and between 18-20% of the specimens submitted for VZV contained HSV.

Table 1. Summary of results obtained by traditional methods.

Table 2. Summary of results obtained by novel multiplex molecular assays.

References

Acknowledgements
Luminex Corp, Austin, TX and Quidel Corp, San Diego, CA, for providing supplies.