Formulation development of the DuoGel: a dual chamber vaginal/rectal anti-HIV microbicide gel

Anthony Ham1, William Lustig1, Sean T. Nugent1, Jennifer Peters1, David Katz2, Cory Shelter1, Charlene Dezuitt1, Ashlee Bocar1, Karen W. Buckheit1, and Robert W. Buckheit, Jr.1

1ImQuest Biosciences; Frederick, MD, USA; 2Duke University; Durham, NC, USA; 3Magee-Womens Research Institute; Pittsburgh, PA, USA

ABSTRACT

The DuoGel is an vaginal/rectal anti-HIV microbicide formulation containing IQP-0528. It is currently being developed as a single product for both vaginal and rectal administration to address the increasing number of both vaginal and anal transmissions in the same individual by reducing complexity of managing separate transmittable wound therapies.

METHODS

The DuoGels with IQP-0528 were formulated from GRAS excipients approved for both vaginal and rectal administration (hydroxyethyl cellulose, glycerin, methyl/propyl paraben, and carbomer) and evaluated from physicochemical and biological properties. First, the pH and osmolality of the DuoGels were evaluated from physicochemical and biological properties. First, the pH and osmolality of the DuoGels were measured across a pH range of 1E-5 to 200 s-1. pH stability was evaluated over a 21 day culture with HIV replication being monitored via p24 immunohistochemistry.

EXPLAIN TOXICITY AND EFFICACY:

Toxicity: The toxicology of the DuoGels was performed in both polarized explant environments with an EC50 value of 2.34 ± 0.49 ng/mL.

Efficacy: Efficacy was evaluated in PBMC against HIV-1 infection for 7 days. The effective concentration to inhibit 50% infection (EC50) was evaluated for unformulated IQP-0528, FID3000, FID3001, and FID3002. This study has identified a gel formulation that has the potential to safely prevent HIV-1 infection in both vaginal and rectal environments with an EC50 value of 2.34 ± 0.49 ng/mL.

RESULTS

The rheology study has identified a gel formulation that has the potential to safely prevent HIV-1 infection in both vaginal and rectal environments with an EC50 value of 2.34 ± 0.49 ng/mL.

**Compared to Universal placebo gel

* Into endocervical and colorectal tissues.

** Performed in vitro

Drugs were selected in a panel of eight human cell lines and Lactobacilli for 24 hours.

** Spreadability

The gel formulations were evaluated under both a sheer stress sweep and a shear rate sweep.

SPREADABILITY

In vitro spreadability was evaluated by measuring the area covered by the gel (solid line) vs. volume of gel that leaked (dashed line) was evaluated for 24 hours.

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Table: Spreadability

<table>
<thead>
<tr>
<th>Product</th>
<th>Spreadability (%)</th>
<th>FID3000</th>
<th>FID3001</th>
<th>FID3002</th>
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<tr>
<td>Spreadability (%)</td>
<td>91.72</td>
<td>89.79</td>
<td>86.69</td>
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</tbody>
</table>

CONCLUSION

DuoGel formulation FID3002 was identified as the lead formulation for the vaginal/rectal microbicide gel due to its defined target product profile and in vitro anti-viral activity.