The Antiviral Pipeline: HIV, HCV, and Influenza

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Even for companies that have achieved blockbuster status with one or more antiviral drugs, resistance to those drugs will always pose a threat. Thus, there is a constant need to update the development pipeline and consider novel ways to combine different antiviral drugs. This report explores clinical development activities in HIV, HCV, and influenza and the market drivers in these areas, as well as:

- How the evolution of drug resistance among viruses drives both the pace and direction of antiviral development
- Approaches to antiviral drug design and the potential for antiviral combination therapy
- Antiviral development activities for the unmet-medical-need niches of poliovirus, West Nile virus, and smallpox
- Future market trends
The Antiviral Pipeline: HIV, HCV, and Influenza

The Antiviral Pipeline: HIV, HCV, and Influenza report provides a detailed examination of clinical development activities in these major areas of antiviral development. It also explores promising open market space for all of these various pipeline compounds and future market trends. A major overarching theme of this report is the evolution of resistance among viruses. Many companies in all three areas of antiviral development considered here are exploring the potential for combination therapy to become the standard of care. The hope is that by simultaneously targeting different components of viral biology with different drugs, resistance will be less likely or slower to emerge.

In addition to resistance, HIV drug development is being driven by increasing numbers of people being prescribed anti-HIV drugs and their changing drug needs over time. There are more than 60 new anti-HIV compounds in development, with the trend toward fixed-dose combination drugs. Nonetheless, some of the most exciting anti-HIV compounds in development are single-agent drugs. Given that efficacious drugs exist now that can prolong and improve the quality of life, arguably one of the greater challenges is not the need for more efficacious anti-HIV drugs but more convenient anti-HIV drugs.

HCV is the next most active area of antiviral development after HIV. The HCV market is being driven by the need for more affordable, safer, and more effective therapies. The standard of care is expensive, and many patients have a difficult time tolerating the therapy. Many analysts and experts are predicting a fast rate of market growth when two novel, late-stage protease inhibitors receive regulatory approval, which is expected to happen in 2011. Another exciting trend in HCV antiviral development is increased testing of combinations of direct-acting antivirals, particularly those being tested for their efficacy in the absence of standard of care.

The H5N1 (“bird flu”) and H1N1 (“swine flu”) viruses have stimulated interest in development of influenza antivirals. As with HIV and HCV, combination therapy has emerged as arguably the next great wave in influenza drug development, and a large part of the reason is resistance. Other concerns include the need: for a reliable form that can be administered to seriously ill patients; to determine safety and efficacy in high-risk populations; to determine under which circumstances combination therapy is safe and effective; and for more simplified dosing. The lead influenza antivirals currently in development show the potential to meet these other needs.

Clearly, the field of antiviral drug development encompasses far more than HIV, HCV, and influenza. Many companies are also investing in the development of antiviral agents for the treatment of a wide range of other medically important viral infections. By way of illustration, The Antiviral Pipeline: HIV, HCV, and Influenza report also explores pipelines leading to some of the smaller, unmet-medical-need niches (i.e., poliovirus, West Nile virus, smallpox virus).

Table 3.5. Select List of HCV Protease Inhibitors in Development

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Agent</th>
<th>Stage of Clinical Development</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merck (Whitehouse Station, NJ)</td>
<td>bicaprivir</td>
<td>Phase II</td>
<td>--</td>
</tr>
<tr>
<td>Vertex (Cambridge, MA/Vertex (Beerse, Belgium)</td>
<td>telaprevir</td>
<td>Phase II</td>
<td>Also being tested in combination with the non-nucleoside polymerase inhibitor tipranavir and the protease inhibitor telaprevir</td>
</tr>
<tr>
<td>Boehringer Ingelheim (Ingelheim, Germany)</td>
<td>BI 701355</td>
<td>Phase II</td>
<td>Also being tested in combination with the polymerase inhibitor telaprevir</td>
</tr>
<tr>
<td>Biingel Albers Squibb (New York, NY)</td>
<td>BMS-663062</td>
<td>Phase II</td>
<td>Also being tested in combination with the NS5A inhibitor BMS-790052</td>
</tr>
<tr>
<td>Genentech (San Diego, CA)</td>
<td>CTZ 102</td>
<td>Phase II</td>
<td>--</td>
</tr>
<tr>
<td>InterMune (Brisbane, CA/ONC2009 (South San Francisco, CA)</td>
<td>domivirine</td>
<td>Phase II</td>
<td>Also being tested in combination with the non-nucleoside polymerase inhibitor tipranavir</td>
</tr>
<tr>
<td>Gilead (Foster City, CA)</td>
<td>GS 9256</td>
<td>Phase II</td>
<td>Also being tested in combination with the non-nucleoside polymerase inhibitor GS 31890</td>
</tr>
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Source: Insight Pharma Reports
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