# Drug pipeline: Q211

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There was a notable uptick in drug approvals by the US Food and Drug Administration (FDA) compared with the same period last year. The agency approved two hepatitis C drugs, Victrelis (boceprevir) and Incivek (telaprevir) as well as a second autologous cell therapy, laViv (azficel-T), for skin wrinkle reduction. The V600E mutation-specific B-RAF inhibitor vemurafenib for melanoma, translation modulator ataluren for cystic fibrosis and monoclonal antibody teplizumab for diabetes showed proof of efficacy in trials.

**Notable regulatory approvals (Q2 2011)**

| Drug/company | Indication | Approval and drug information |
|---|---|---|
| Zytiga (abiraterone)/ Johnson & Johnson | Prostate cancer | 4/28/11, FDA. Inhibitor of 17-alpha-hydroxylase/ C17,20 lyase, a cytochrome p450 complex involved in testosterone production. |
| Victrelis (boceprevir)/Merck | HCV infection | 5/13/11, FDA. HCV NS3 protease inhibitor. |
| Incivek (telaprevir)/Vertex Pharmaceuticals | HCV infection | 5/23/11, FDA. HCV NS3 protease inhibitor. |
| Dificid (fidaxomicin)/Optimer Pharmaceuticals | *Clostridium difficile* infection | 5/27/11, FDA. Antibiotic selectively targeting *C. difficile* RNA polymerase. |
| Nulojix (belatacept)/ Bristol-Myers Squibb | Kidney transplant rejection | 6/15/11, FDA. CD80/CD86 costimulatory signal blocker, a 2-amino acid mutant of abatacept (recombinant cytotoxic T-lymphocyte antigen 4 fused to a human IgG1 Fc fragment). |
| laViv (azficel-T)/ Fibrocell Science | Skin wrinkles | 6/21/11, FDA. Cell therapy of *in vitro* expanded autologous fibroblasts that are injected to reduce wrinkles. |
| Bydureon (exenatide)/ Amylin Pharmaceuticals | Type II diabetes | 6/21/11, EMA. Sustained release human glucagon-like peptide 1. US decision is pending studies to address a complete response letter from 10/19/10. |
| Xarelto (rivaroxaban)/ Bayer | Venous thromboembolism | 7/1/11, FDA. Oral anticoagulant, Factor Xa inhibitor. |

Source: BioMedTracker, a service of Sagient Research (http://www.biomedtracker.com/). EMA, European Medicines Agency; GABA, gamma aminobutyric acid; HCV, hepatitis C virus.

**Notable regulatory setbacks (Q2 2011)**

| Drug/company | Indication | Setback summary |
|---|---|---|
| Dimebon (latrepirdine)/ Pfizer | Huntingtons' disease | 4/11/11. Company announced that phase 3 trial of the gamma carboline derivative did not meet co-primary end-points. Development is suspended. The drug is thought to inhibit cholinesterase and the NMDA receptor. |
| Solpura (liprotamase)/ Eli Lilly | Exocrine pancreatic insufficiency | 4/15/11. FDA issued complete response letter for the recombinant, porcine-free enzyme replacement that contains lipase, protease and amylase. |
| Beprana (naproxcinod)/ NicOx | Osteoarthritis | 4/20/11. Company withdrew MAA due to negative feed-back from CHMP on the cyclooxygenase-inhibiting nitric oxide-donator for pain and inflammation relief. |
| AMG 827/Amgen | Rheumatoid arthritis | 4/21/11. Company suspended development of anti-IL17 monoclonal antibody owing to disappointing phase 2 trial results. |
| Genasense (oblimersen)/Genta | Melanoma | 5/23/11. Company announced that phase 3 trial of the Bcl-2 antisense drug failed to meet primary endpoint for treatment of melanoma. Development is suspended. Phase 2/3 trials for chronic lymphocytic leukemia and non-small cell lung cancer will continue. |

Source: BioMedTracker, a service of Sagient Research (http://www.biomedtracker.com). MAA, market authorization application (EMA); NMDA, *N*-methyl-D-aspartate; EGFR, epidermal growth factor receptor; CHMP, Committee for Medicinal Products for Human Use (EMA advisory panel).

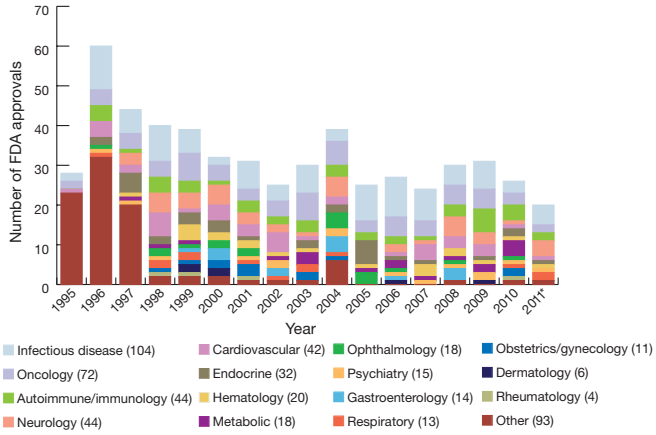
**Notable upcoming regulatory decisions (Q3 2011)**

| Drug/company | Indication | Expected regulatory decision |
|---|---|---|
| Brilinta (ticagrelor)/ AstraZeneca | Acute coronary syndrome | 7/20/11, PDUFA. The adenosine diphosphate recep-tor antagonist was approved in the EU in 12/10. |
| Eylea (aflibercept, intravitreal)/Regeneron | Wet age-related macular degeneration | 8/20/11, PDUFA, priority review. FDA advisory panel voted on 6/17/11 to approve the recombinant VEGF decoy receptor comprising human VEGF receptor extracellular domains and IgG1 Fc region. |
| Firazyr (icatibant)/ Shire Pharmaceuticals | Hereditary angioedema | 8/25/11, PDUFA, second review. FDA advisory panel voted on 6/23/11 in favor of approval of the selective bradykinin B2 antagonist peptide, which received EU approval in July 2008. |
| Adcetris (brentux-imab vedotin)/Seattle Genetics | Hodgkin's lymphoma/ anaplastic large cell lymphoma | 8/30/11, PDUFA. FDA granted priority review for the antibody-drug conjugate of anti-CD30 mono-clonal antibody (cAC10) attached to monomethyl auristatin E. |
| Evicel (fibrin patch)/ Johnson & Johnson | Hemostasis | 9/16/11, PDUFA. A topical patch comprising flexible matrix coated with human fibrinogen and human thrombin components for wound healing. |

Source: BioMedTracker, a service of Sagient Research (http://www.biomedtracker.com/). PDUFA, Prescription Drug User Fee Act; VEGF, vascular endothelial growth factor.

## FDA approvals by lead indication area

This year 21 new drugs have been approved, compared with only 15 in the first half of 2010.




Source: FDA; BioMedTracker, a service of Sagient Research (http://www.biomedtracker.com/). *2011 partial year from January 1 to July 7. Numbers in parentheses after legends are total approvals since 1995.

**Notable trial results (Q2 2011)**

| Drug/company | Indication | Results |
|---|---|---|
| Microplasmin (ocriplasmin)/ ThromboGenetics | Vitreomacular adhesion | Phase 3, double-masked study of the truncated plas-min met primary endpoint in nonsurgically resolving symptomatic vitreomacular adhesion. (*Ophthalmology Times*, 4/15/11) |
| Esbriet (pirfenidone)/ InterMune | Idiopathic pul-monary fibrosis | Phase 3 trials of the p38 kinase inhibitor, which was approved in EU on 2/28/11, met primary and second-ary endpoints, supporting favorable benefit-risk pro-file. (*The Lancet* **377**, 1760–1769, 2011) |
| LY2140023 (pomaglumetad methionil)/Eli Lilly | Schizophrenia | Phase 2 trial of the prodrug of metabotropic glutamate 2/3 (mGlu2/3) receptor agonist LY-404039 did not show significant efficacy increase compared to pla-cebo. (*J. Clin. Psychopharmacol.* **31**, 349–355, 2011) |
| Talactoferrin alfa/ Agennix | Non-small cell lung cancer | Phase 2 trial of the recombinant human lactoferrin alpha, as a dendritic cell recruiter and activator, met primary endpoint. (*J. Thor. Oncol.* **6**, 1098–1103, 2011) |
| PLX4032 (vemurafenib)/Roche | Melanoma | Phase 3 trial of the B-RAF V600E mutation kinase inhibitor met primary endpoints and improved patient survival. (*N. Engl. J. Med.* **364**, 2507–2516, 2011) |
| PTC 124 (ataluren)/ PTC Therapeutics | Cystic fibrosis | Phase 2 study of the small molecule that overrides translational blockade due to nonsense mutations met primary and secondary endpoints supporting further investigations. (*Eur. Respiratory J.* **38** 29–69, 2011) |
| Teplizumab/ MacroGenics | Type I diabetes | Phase 2/3 study of the humanized, non-Fc receptor binding, anti-CD3 monoclonal antibody met primary endpoints in reducing insulin requirement and reduc-ing glycated hemoglobin A1c. (*The Lancet* published online, doi:10.1016/S0140-6736(11)60931-8 (28 June 2011). |
| Bardoxolone/Reata Pharmaceuticals | Chronic kidney disease/diabetic nephropathy | Phase 2 study of the IKK, STAT3 and NF-kB inhibitor and Nrf2 activator met primary and second-ary endpoints with significantly increased glomerular filtration rate. (*N. Engl. J. Med.* published online, doi:10.1056/NEJMoa1105351 (8 July 2011). |

Source: BioMedTracker, a service of Sagient Research (http://www.biomedtracker.com/).

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