



R&D FOCUS drugnews

PART OF IMS LIFECYCLE

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azilsartan medoxomil

Takeda marketed, USA (hypertension)

Azilsartan medoxomil (EDARBI) has been launched in the USA for the treatment of hypertension in adults, Takeda announced on 15 April 2011. The US FDA has approved a change in the product labeling highlighting the connection between lowering blood pressure and decreased risks of cardiovascular outcomes such as strokes and heart attacks. Azilsartan medoxomil is an angiotensin II receptor antagonist. An MAA was submitted to the EMA for the agent as a therapy for essential hypertension in October 2010.

Launches

belimumab

Human Genome Sciences marketed, USA (systemic lupus erythematosus)

Human Genome Sciences reported on 14 April 2011 that belimumab (BENLYSTA) is available in the USA for the treatment of systemic lupus erythematosus (SLE). The product was approved for this indication in the USA in March 2011.

Human Genome Sciences and GlaxoSmithKline are co-developing belimumab, an anti-B lymphocyte stimulator fully human monoclonal antibody (anti-BlyS MAb), for the

treatment of SLE. An MAA was submitted to the EMA for this indication in June 2010; regulatory applications have subsequently been filed in Switzerland, Canada, and a number of other regions.

levonorgestrel + ethinylestradiol

Paladin marketed, Canada (contraception)

On 18 April 2011 Paladin reported the launch of SEASONIQUE as an oral contraceptive in Canada.

SEASONIQUE is an extended-cycle oral contraceptive comprising levonorgestrel and ethinylestradiol.

LAUNCHES

APPROVALS

LICENSING

PRODUCTS & BIOTECHNOLOGY

TECHNOLOGY

TRANSFER SPOTLIGHT

Offers from Johns Hopkins University

CONFERENCES

American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA

BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy

News from GlycoVaxyn

Updates from Isu Abxis

Opportunities with Limerick BioPharma

Opportunities with M's Science

BioTrinity 2011, 12-14 April 2011, Newbury, UK

News from Scancell

Opportunities with NovaBiotics

COMPANY FOCUS

Focus on Ventrus

NEWLY REPORTED DRUGS IN R&D FOCUS

PRODUCT PHASE CHANGES REPORTED IN R&D FOCUS

R&D Focus Drug News

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IMS LifeCycle

UNIQUE INSIGHTS INTO DRUG STRATEGIES AT THE THREE CRITICAL STAGES OF LIFECYCLE MANAGEMENT: R&D, LAUNCH ACTIVITY AND PATENT EXPIRY



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The product is a 91-day regimen, comprising 84 active tablets of 0.15 mg levonorgestrel/0.03 mg ethinylestradiol, followed by seven active tablets of 0.01 mg ethinylestradiol. The contraceptive was launched in the USA in July 2006.

eslicarbazepine acetate

Eisai marketed, Greece (epilepsy)

On 19 April 2011 Eisai announced that it has launched eslicarbazepine acetate (ZEBINIX) in Greece as an adjunctive therapy for adults with partial-onset seizures, with or without secondary generalization.

Eslicarbazepine acetate, a sodium channel blocker and prodrug of eslicarbazepine, has been launched in several European markets including Germany, Spain and the UK as adjunctive therapy in adults with partial-onset epileptic seizures. The agent was approved in the EU for this indication in April 2009. A Complete Response letter regarding an NDA for this indication was issued by the US FDA in May 2010; Sunovion is in discussion with the US FDA regarding plans to resubmit the NDA.

Approvals

aflibercept

Regeneron Priority Review, USA (wet AMD)

Regeneron reported on 18 April 2011 that the US FDA has granted Priority Review status to the company's BLA for aflibercept ophthalmic solution (VEGF Trap-Eye) for the treatment of the neovascular form of wet age-related macular degeneration (AMD). The PDUFA date for this filing is 20 August 2011.

Aflibercept is an angiogenesis inhibitor and fusion protein that prevents VEGF binding to its native receptor. VEGF Trap-Eye, an ophthalmic formulation of aflibercept specifically designed for direct injection into a patient's eye, is being developed in collaboration with Bayer. The therapy is under phase III evaluation for the treatment of eye conditions including wet age-related macular edema

(wet AMD), diabetic macular edema (DME), central retinal vein occlusion (CRVO) and choroidal neovascularization (CNV).

bevacizumab

Roche recommended for approval, EU (breast cancer) (in combination with capecitabine)

On 15 April 2011 Roche announced that the CHMP of the EMA has issued a positive opinion for an extension to the label of bevacizumab (AVASTIN) to include use in combination with capecitabine for the first-line treatment of metastatic breast cancer in patients for whom treatment with other chemotherapy options, including taxanes and anthracyclines, is not considered appropriate. The submission for the label extension is based on results from the phase III RIBBON-1 trial, which demonstrated a significant increase in progression-free survival in patients receiving bevacizumab in combination with capecitabine compared with patients receiving capecitabine alone.

Bevacizumab, a monoclonal antibody against vascular endothelial growth factor (VEGF), is available worldwide for the treatment of colorectal cancer in combination with chemotherapy, and in the USA and the EU for the treatment of renal cell carcinoma, nonsmall cell lung cancer (NSCLC) and breast cancer.

Bio-T-Gel

Teva filing accepted for review, USA (hypogonadism)

BioSante announced on 13 April 2011 that the US FDA has accepted for filing an NDA, submitted by Teva in January 2011, for the approval of Bio-T-Gel for the treatment of hypogonadism or low testosterone in men. The FDA set a PDUFA date of 14 November 2011.

Bio-T-Gel is a once-daily transdermal gel formulation of testosterone. BioSante and Teva entered a license agreement for the development of the male testosterone therapy in December 2002; this agreement was re-initiated in June 2007.

BYDUREON

Lilly recommended for approval, EU (diabetes)

On 15 April 2011 Lilly, Amylin and Alkermes reported that the CHMP of the EMA has issued a positive opinion recommending the approval of once-weekly exenatide 2 mg injection (BYDUREON) in the EU in combination with metformin, a sulfonyleurea with or without metformin, or a thiazolidinedione with or without metformin, to improve glycemic control in adults with type II diabetes who have not achieved adequate glycemic control on these oral therapies.

BYDUREON was formulated using Alkermes' proprietary MEDISORB drug delivery technology and is being developed under a collaboration between Amylin, Alkermes and Lilly for the treatment of type II diabetes. A second Complete Response letter to an NDA for the approval of the product in the USA was issued by the FDA in October 2010. The companies plan to submit a response in second half 2011.

dabigatran etexilate

Boehringer Ingelheim recommended for approval, EU (thrombosis)

On 15 April 2011 Boehringer Ingelheim reported that it has received a positive opinion from the CHMP of the EMA recommending the approval of dabigatran etexilate (PRADAXA) for the prevention of stroke and systemic embolism in adult patients with nonvalvular atrial fibrillation with one or more risk factors.

Dabigatran etexilate, a reversible direct thrombin inhibitor, was first launched in the UK and Germany in April 2008 for the prevention of venous thromboembolic events in patients who have undergone total hip or knee replacement surgery, and has subsequently been made available in many major markets worldwide for this indication. The product is also available in the USA and Canada for the prevention of stroke and systemic embolism in patients with nonvalvular atrial fibrillation.

liprotamase

Lilly Complete Response letter, USA (pancreatic insufficiency)

Lilly reported on 15 April 2011 that the US FDA has issued a

Complete Response letter for its NDA for liprotamase in the treatment of patients with exocrine pancreatic insufficiency. The FDA has requested that Lilly conduct an additional trial of the agent prior to resubmission of the NDA.

Liprotamase, a fixed combination of nonporcine lipase, proteinase and amylase enzymes, is under development for the oral, non-systemic treatment of malabsorption resulting from exocrine pancreatic insufficiency associated with cystic fibrosis, chronic pancreatitis and lipid metabolism disorders. The formulation utilizes Althea's proprietary technology to stabilize the lipase, allowing it to be bioactive in the gastrointestinal tract.

lumiracoxib

Novartis submission withdrawn, EU (osteoarthritis)

On 19 April 2011 the EMA announced that Novartis has withdrawn its MAA seeking approval for lumiracoxib (JOICELA; PREXIGE) in the EU for the treatment of osteoarthritis symptoms. The submission was for lumiracoxib in combination with a genetic marker that can identify patients carrying the DQA1*0102 allele, who should not receive lumiracoxib due to a risk of liver-related adverse events. Novartis informed the EMA that it was unable to address the CHMP's request for additional data within the necessary timeframe.

Lumiracoxib, an oral cyclooxygenase (COX) 2 inhibitor, is available in Mexico, Ecuador and the Bahamas for short-term use in the treatment of acute pain indications, including dysmenorrhea and acute gout, and in Mexico for long-term use in the treatment of osteoarthritis. The agent was available in several major markets worldwide, but has since been withdrawn in most regions, including the EU, Australia, Canada, New Zealand, Turkey and several countries in South and Central America and in the Asia Pacific region, because of serious liver-related side effects.

mifepristone

Corcept submitted for approval, USA (Cushing's disease)

On 15 April 2011 Corcept announced that it has submitted an NDA to the US FDA for the approval of mifepristone

(CORLUX) as a treatment for Cushing's disease. Concept included a proposal for its Risk Evaluation and Mitigation Strategies (REMS) and has requested Priority Review of its NDA.

Mifepristone, a cortisol (GR-II) receptor and progesterone receptor blocker, is marketed as an abortifacient in several territories worldwide, including in the USA and the EU. The agent is also available in French West Africa for the prophylaxis and treatment of osteoporosis in menopausal women. Concept is also developing mifepristone to mitigate the side effects of antipsychotics. Clinical trials have been conducted in this indication.

nabiximols

GW Pharmaceuticals registered, Czech Republic (muscle spasm)

GW Pharmaceuticals announced on 15 April 2011 that nabiximols oral spray (SATIVEX) has been approved in the Czech Republic for the treatment of spasticity due to multiple sclerosis (MS). This follows the successful closing of the first European Mutual Recognition Procedure (MRP) for nabiximols in the treatment of spasticity due to MS in March 2011, in which nabiximols met the requirements for approval in Germany, Italy, Denmark, Sweden, Austria and the Czech Republic. The agent is expected to be launched for this indication before the end of 2011 in Germany, Denmark and Sweden; launches in Italy, Austria and the Czech Republic are expected in 2012.

Nabiximols is a product based on extracts of the plant *Cannabis sativa* containing tetrahydrocannabinol and cannabidiol. The agent is available in Canada as an adjunctive therapy for symptomatic relief of neuropathic pain in patients with MS and for the treatment of pain in patients with advanced cancer; it is also approved in this region as an adjunctive treatment for symptomatic relief of spasticity in adult patients with MS. Nabiximols has been launched in Spain and the UK for the treatment of spasticity due to MS; the agent has also been approved for this indication in New Zealand. Phase III evaluation is ongoing in Europe for nabiximols in the treatment of advanced cancer pain.

naproxcinod

NicOx submission withdrawn, EU (osteoarthritis)

NicOx announced on 20 April 2011 that it has withdrawn an MAA for the approval of naproxcinod as a treatment for osteoarthritis in the EU. The company's decision was based on feedback from the EMA's CHMP, which considered that the submitted information could not allow the committee to conclude on a positive benefit-risk balance, thus it would not issue a positive opinion. NicOx and Ferrer, which has an option to exclusively distribute naproxcinod in Greece and Portugal, and co-market the agent in Spain and Germany, are evaluating the options for the further development of naproxcinod in Europe.

Naproxcinod is a COX-inhibiting nitric oxide donator (CINOD) with analgesic and anti-inflammatory properties, being developed as a therapy for the signs and symptoms of osteoarthritis. An NDA was submitted to the US FDA in September 2009 for this indication; the FDA issued a Complete Response letter requesting additional studies in July 2010. Three pivotal phase III studies of the agent in osteoarthritis patients have been completed.

natalizumab

Elan, Biogen Idec labeling change request recommended

Biogen Idec and Elan announced on 18 April 2011 that the CHMP of the EMA has adopted a positive opinion recommending the inclusion of anti-JC Virus antibody status as an additional risk factor to the natalizumab (TYSABRI) label to further stratify the risk of progressive multifocal leukoencephalopathy (PML) in patients with multiple sclerosis. Due to an increased risk of PML in patients receiving natalizumab, Biogen Idec and Elan submitted in December 2010 an sBLA to the US FDA and a Type II Variation to the EMA requesting review and approval to update the prescribing information and summary of product characteristics for natalizumab.

Natalizumab, a humanized monoclonal antibody targeting the α_4 subunit of $\alpha_4\beta_1$ (VLA-4) and $\alpha_4\beta_2$ integrins, is marketed for the treatment of multiple sclerosis (MS) in the USA, the EU and a number of other regions. The

product is also available in the USA for the treatment of Crohn's disease.

rituximab

Biogen Idec registered, USA (ANCA-associated vasculitis)

On 19 April 2011 Genentech and Biogen Idec announced that the US FDA has approved rituximab (RITUXAN), in combination with corticosteroids, for the treatment of two severe forms of the autoimmune disorder antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis: Wegener's granulomatosis (WG) and microscopic polyangiitis (MPA). The approval was supported by data from the RAVE phase II/III trial of rituximab in patients with ANCA-associated vasculitis.

Rituximab is a chimeric IgG1-kappa monoclonal antibody with mouse variable and human constant regions which targets CD20-positive B cells. The product is marketed worldwide for the treatment of non-Hodgkin's lymphoma (NHL), and in the USA and the EU for the treatment of chronic B-cell lymphocytic leukemia (CLL) and rheumatoid arthritis.

rivaroxaban

Bayer submitted for approval, Japan (stroke)

Bayer announced on 14 April 2011 that rivaroxaban (XARELTO) has been submitted for approval to the Japanese Ministry of Health, Labour and Welfare for the prevention of stroke in patients with atrial fibrillation. The submission is based on results from the global ROCKET AF study and the J-ROCKET AF phase III trial conducted in Japan.

Rivaroxaban, an antithrombotic agent, is being co-developed by Bayer and Johnson & Johnson. The agent is available in most major markets, worldwide, excluding the USA, for the prevention of venous thromboembolic events (VTE) in patients who have undergone elective total hip or total knee replacement surgery. The agent is under regulatory review in the USA for the prevention of stroke and systemic embolism in patients with non-valvular atrial fibrillation, and in the EU for this indication and

for the treatment of deep vein thrombosis (DVT) and the prevention of recurrent DVT and pulmonary embolism.

tocilizumab

Roche registered, USA (systemic juvenile idiopathic arthritis)

The US FDA has approved tocilizumab (ACTEMRA) for the treatment of active systemic juvenile idiopathic arthritis (sJIA) in patients two years of age or older, Genentech (a member of the Roche Group) announced on 15 April 2011. The agent can be administered alone or in combination with methotrexate. The approval was supported by results from the phase III TENDER study in sJIA patients.

Tocilizumab, a humanized monoclonal antibody targeted against the human IL-6 receptor, is marketed in the USA, the EU, Japan and a number of other regions for the treatment of moderate-to-severe rheumatoid arthritis. The product is also available in Japan for the treatment of juvenile idiopathic arthritis (JIA) and sJIA. Approval is pending in the EU for the treatment of sJIA.

Licensing

azimilide

Forest, Blue Ash transfer of rights

Forest reported on 19 April 2011 that it has signed an asset purchase agreement with Blue Ash, under which Forest has been assigned a licensing agreement between Warner Chilcott and Blue Ash providing for global rights to azimilide. The asset purchase deal stipulates an upfront payment and future commercialization-based milestone payments from Forest to Blue Ash. Under the assigned licensing agreement, Forest will be responsible for future development and commercialization activities and associated costs, and will pay royalties on net sales of the product to Warner Chilcott.

Azimilide, a class III antiarrhythmic, is being developed for use in patients with implantable defibrillators (ICD) to reduce the frequency and severity of ICD discharges. Following an Approvable letter issued in 2006, the US FDA stated in May 2008 that, for azimilide to be approved, a small confirmatory

trial should be conducted. In 2010, Blue Ash received agreement from the US FDA on the design of a registrational phase III trial under a Special Protocol Assessment.

Debio 1142

Debiopharm, Aurigene licensing agreement

On 14 April 2011 Debiopharm and Aurigene announced that they entered into an option and exclusive worldwide license agreement on 23 March 2011 regarding the development and commercialization of Debio 1142. The program aims to identify an inhibitor of an undisclosed oncology pathway which plays essential roles in various solid tumors, including resistance to chemotherapy. Further details of the agreement were not disclosed.

drug delivery system, topical etodolac, MEDRx

Kowa, MEDRx licensing agreement

Kowa and MEDRx announced on 24 March 2011 that they have entered into a license agreement regarding a topical patch formulation of etodolac (MRX 7EAT), being developed by MEDRx for the treatment of pain. Under the terms of the agreement, Kowa has acquired exclusive rights to market and sell the product in the USA and Puerto Rico. MEDRx will receive an upfront fee, development and sales milestone payments, and is eligible to receive tiered royalties on sales of the product. MEDRx will supply the etodolac patch in the above-mentioned territories. No financial details of the agreement were disclosed.

The topical patch formulation of the NSAID etodolac, which also contains lidocaine, is undergoing phase III evaluation in the treatment of acute pain.

drug design technology, antibody-drug conjugates, Seattle Genetics & HuMax CD74

Seattle Genetics, Genmab licensing agreement

Genmab and Seattle Genetics announced on 19 April 2011 that they have entered into a second agreement under which

Genmab has the rights to use Seattle Genetics' antibody-drug conjugate (ADC) technology for the development of HuMax CD74, an antibody targeting CD74 and undergoing preclinical studies for the treatment of cancer. Genmab is responsible for research, manufacturing, preclinical development and phase I evaluation of any products resulting from this agreement. Seattle Genetics has received an undisclosed upfront payment and will receive research support payments for any assistance provided to Genmab. Seattle Genetics also has the right to exercise a co-development and co-commercialization option for any products arising from the agreement at the end of phase I evaluation. If the company exercises its option, Genmab will receive a payment and the two companies will co-develop the product(s) and share all costs and profit on a 50:50 basis. If Seattle Genetics does not exercise its option, it will receive fees, milestone payments and mid-single digit royalties on global net sales.

golimumab & infliximab

Merck & Co, Johnson & Johnson licensing agreement modified

Merck & Co and Johnson & Johnson announced on 15 April 2011 that they have amended their distribution agreement relating to the development, commercialization and distribution of infliximab (REMICADE) and golimumab (SIMPONI). Under the terms of the amended agreement, Johnson & Johnson will re-acquire exclusive marketing rights to infliximab and golimumab in Canada, Latin America, the Middle East, Africa and Asia Pacific from Merck & Co, which will retain exclusive marketing rights in Europe, Russia and Turkey. Merck & Co and Johnson & Johnson will share equally in all profits derived from Merck & Co's exclusive distribution of the products in the retained territories. These changes will be effective from 1 July 2011. Johnson & Johnson will also receive a one-time payment of US\$500 million during April 2011.

Schering-Plough (now Merck & Co) and Centocor (now Centocor Ortho Biotech, a Johnson & Johnson company) originally entered into the agreement in March 1998; the agreement was modified in December 2007. The current amendment concludes the arbitration process that Johnson & Johnson initiated in May 2009, in which the company requested a ruling related to the agreement following the

announcement of the proposed merger between Merck & Co and Schering-Plough.

Infliximab and golimumab are monoclonal antibodies which target tumor necrosis factor (TNF)-alpha. Infliximab is marketed in the USA, the EU, Japan, and a number of other regions worldwide, for the treatment of inflammatory disorders including Crohn's disease, rheumatoid arthritis and ulcerative colitis. Golimumab is available in the USA, Canada and the EU for the treatment of rheumatoid arthritis, ankylosing spondylitis and psoriatic arthritis.

GPCR-HIT

Takeda, Dimerix licensing agreement

On 13 April 2011 Dimerix announced that it has entered into a second research agreement with Takeda Cambridge, a UK subsidiary of Takeda. Dimerix will use its GPCR-HIT technology platform to work with additional undisclosed G-protein coupled receptors (GPCRs) that are of interest to Takeda. GPCR-HIT is a proprietary cell-based assay that enables the systematic identification of GPCRs that form complexes of different receptors (heteromers) in a ligand-responsive manner, and compounds that selectively or allosterically act on them. Takeda and Dimerix entered into their first research agreement in April 2010.

ifetroban

Vanderbilt University, Cumberland transfer of rights

Cumberland announced on 19 April 2011 that it has acquired rights from Vanderbilt University (USA) to develop and commercialize ifetroban (HEPATOREN). Under the agreement, the company has also acquired rights to non-clinical data, an extensive clinical database, manufacturing processes, know-how and intellectual property related to the agent. Cumberland intends to develop that agent as an injectable treatment for hepatorenal syndrome (HR) in critically ill hospitalized patients. The US FDA has approved an IND submission for ifetroban, and a phase II trial has initiated in the treatment of HR.

Ifetroban is a thromboxane A₂/prostaglandin endoperoxide receptor (TPR) antagonist, which displays antiplatelet and

antivasospastic activities. Phase II evaluation of the agent in the treatment of venous ulcers had previously been conducted by Bristol-Myers Squibb, which subsequently donated the program to Vanderbilt University.

JNJ Q2

Furiex, Janssen Pharmaceutica licensing agreement modified

On 19 April 2011 Furiex announced that it has acquired full exclusive rights to JNJ Q2 (JNJ 32729463) after Janssen Pharmaceutica (a Johnson & Johnson company) decided not to exercise its option to resume development and commercialization of the agent. Janssen Pharmaceutica made this decision after conducting a broad strategic review of its portfolio in infectious diseases. Furiex may pay Janssen Pharmaceutica regulatory- and sales-based milestone payments as well as royalties.

JNJ Q2, a broad-spectrum fluoroquinolone antibiotic with activity against Gram positive and Gram negative bacteria and meticillin-resistant *Staphylococcus aureus* (MRSA), is being developed as an oral and intravenous therapy for the treatment of acute bacterial skin and skin structure infections (ABSSSI) and respiratory infections. PPD (now Furiex) licensed rights to the compound from Janssen Pharmaceutica (with an option for Janssen Pharmaceutica to resume development and commercialization) in November 2009. Furiex has completed a phase II trial of JNJ Q2 in the treatment of ABSSSI and is planning an end-of-phase II meeting with the US FDA in 2011 to prepare phase III development in this indication. A phase II trial in patients with community-acquired bacterial pneumonia (CABP) is ongoing.

lymphoma therapy, Engineered Toxin Bodies, Molecular Templates/Memorial Sloan-Kettering Cancer Center

Molecular Templates and MSKCC enter into a research collaboration

Molecular Templates announced on 15 April 2011 that it has entered into a research collaboration with Memorial

Sloan-Kettering Cancer Center (USA) for the development of Engineered Toxin Bodies (ETBs) targeting CD20 for the treatment of lymphomas. ETBs are targeted small biologic molecules derived from an engineered toxin scaffold that display the cytotoxicity, internalization and pharmacokinetic properties of the parent toxin, but with reduced immunogenicity.

miRNA-targeted anti-angiogenesis therapies, Regulus/University of California at San Diego

Regulus and the University of California at San Diego establish collaboration

Regulus reported on 14 April 2011 that it has established a collaboration with researchers at the University of California at San Diego (UCSD;USA) to develop anti-angiogenic microRNA (miRNA)-targeted therapies. The program will be funded by a University of California Discovery Grant. The collaboration aims to advance UCSD's discoveries, that miR-132 activates angiogenesis in quiescent endothelial cells and that anti-miR-132 agents decrease blood vessel formation, as well as to discover other miRNA's with a role in angiogenesis. Regulus' miRNA platform will be combined with UCSD's expertise in animal models of angiogenesis.

R-SAT

ACADIA, Allergan licensing agreement modified

ACADIA reported on 1 April 2011 that its drug discovery and development collaboration with Allergan has been extended for an additional year, through to March 2012. The companies originally entered into the collaboration, which has been extended several times, in March 2003. Under the agreement, ACADIA's chemical discovery platform R-SAT (Receptor Selection and Amplification Technology) is being used by both companies for the discovery and development of therapeutics for ophthalmic indications, including glaucoma.

ACADIA's R-SAT is a gene-based receptor screening technology that enables the high throughput assay of receptor function. This technology can incorporate genes

encoding receptors with known or unknown biological function.

recombinant factor IX, Amunix/Biogen Idec, recombinant factor VIIa, Amunix/Biogen Idec & recombinant factor VIII, Amunix/Biogen Idec

Biogen Idec, Amunix sign option agreement

On 13 April 2011 Amunix announced that it has entered into an exclusive worldwide research collaboration and option agreement with Biogen Idec for the development of long-lasting, fully recombinant blood factors (factor IX, factor VIII and factor VIIa) using Amunix's XTEN platform technology, for the treatment of hemophilia. XTEN involves the genetic fusion of a clinically proven payload protein to a long, unstructured, hydrophilic amino acid sequence to extend protein half-life. Preclinical studies will be conducted by the two companies and Biogen Idec will be responsible for clinical development, manufacturing and commercialization of candidates selected for further development. Biogen Idec will make an initial upfront payment as well as R&D funding to Amunix. The latter will also be entitled to receive future milestone and royalty payments for candidates chosen by Biogen Idec for development. Further financial details of the agreement were not disclosed.

resminostat

Yakult, 4SC licensing agreement

4SC and Yakult reported on 14 April 2011 that they have signed an agreement under which the latter acquires an exclusive license to develop and commercialize resminostat in Japan. The terms of the deal stipulate that 4SC will receive a EUR6 million upfront payment and up to EUR127 million upon the achievement of milestones (including clinical and regulatory events). In addition, 4SC will receive product sales-based double-digit royalties, which will also include the API costs. Yakult has responsibility for development and clinical requirements in Japan for the agent in hepatocellular carcinoma, colorectal cancer

and other selected cancer indications. Resminostat will be exclusively supplied to Yakult by 4SC.

Resminostat, an oral histone deacetylase (HDAC) inhibitor, is under phase II evaluation in the treatment of hepatocellular carcinoma and Hodgkin's lymphoma, and phase I/II evaluation in advanced and metastatic Kras-mutant colorectal cancer.

sin catechins

MediGene, Triton Pharma licensing agreement

On 19 April 2011 MediGene announced that it has signed an exclusive license and supply agreement with Triton Pharma under which the latter has acquired commercialization rights to sin catechins (VEREGEN) in Canada. Under the terms of the agreement, Triton Pharma will be responsible for regulatory approval of sin catechins in Canada. MediGene is eligible to receive milestone payments of up to EUR2.1 million, as well as double-digit royalties on sales of the product.

Sin catechins, a topical formulation of different catechins, is available in the USA, Austria and Germany as a treatment for genital warts. A second wave of applications for the approval of the agent as a treatment for genital warts within the European Union Mutual Recognition Procedure is planned, with Germany acting as the Reference Member State.

tasquinimod

Active Biotech, Ipsen licensing agreement

Active Biotech and Ipsen announced on 18 April 2011 that they have entered into an agreement whereby the latter has acquired exclusive rights to commercialize tasquinimod (TASQ) worldwide, excluding North and South America, and Japan. The companies will co-develop the agent for the treatment of castration-resistant prostate cancer, with potential for development in additional oncology indications. Under the terms of the agreement, Active Biotech is responsible for conducting and funding a pivotal phase III trial, and will receive up to EUR200 million from Ipsen, comprising a EUR25 million upfront payment and clinical-, regulatory- and commercialization-based milestone payments. Ipsen will also pay Active Biotech progressive double-digit royalties on net sales and will fund and conduct a European supportive study in

prostate cancer patients. Costs related to the development of tasquinimod for other cancer indications will be shared.

Tasquinimod, a quinoline compound, has antiangiogenic properties and binds to target molecule S100A9, inhibiting its interaction with pro-inflammatory receptors. A phase III trial of the agent is ongoing in patients with metastatic castration-resistant prostate cancer.

TeloB-VAX

University of California at San Diego, Adamis transfer of rights

On 19 April 2011 Adamis reported that it has acquired rights to a patent related to TeloB-VAX from the University of California at San Diego (USA). The company also acquired rights to a complementary patent from the Dana-Farber/Harvard Cancer Center (USA). TeloB-VAX is a therapeutic cancer vaccine comprising autologous circulating B lymphocytes that have been transfected with an engineered plasmid DNA. Transfection of the plasmid DNA into the B cell is spontaneous, requiring no facilitating molecules or devices. The cells can be re-infused back into the patient following a 60 minute incubation with the plasmid DNA. The vaccine induces an immune response against the telomerase reverse transcriptase (TERT). A phase I trial of the vaccine in patients with castrate-resistant prostate cancer (CRPC) has been conducted by the University of California at San Diego. The vaccine was safe, non-toxic and well tolerated. A specific CD8 T-cell response was induced and T cells induced post-vaccination were shown to specifically kill prostate cancer cells.

vaccine, fibroblast activation protein, Advaxis

Advaxis, Wistar Institute research collaboration

Advaxis announced on 14 April 2011 that it has entered into a research collaboration with the Wistar Institute (USA) whereby Advaxis will use the institute's mouse models to assess fibroblast activation protein (FAP) as a therapeutic cancer target, and as a basis for the development of a live attenuated *Listeria monocytogenes* vaccine targeting FAP using Advaxis' Lm-LLO technology. The vaccine could

comprise a single antigen or two antigens, consisting of FAP and another tumor target. FAP is overexpressed in the stroma of tumors and its inactivation disrupts the organization of collagen fibers in the matrix of cells which are involved in cell-to-cell communication, cell-matrix interactions and angiogenesis. Studies conducted at the Wistar Institute have shown that genetically deleting or therapeutically targeting FAP significantly reduces tumor growth in mice.

vaccine, NSCLC, Biotech Synergy

Takeda, Biotech Synergy transfer of rights

Biotech Synergy announced on 18 April 2011 that it has acquired rights to a multi-epitope cancer vaccine and cancer epitopes-related portfolio, from Takeda. The cancer vaccine, formerly known as EP 2101 (IDM 2101), is being developed by Biotech Synergy for the treatment of HLA-A2-positive nonsmall cell lung cancer (NSCLC). The agent is made of ten peptides and utilizes nine CTL epitopes from four tumor-associated antigens (TAA); two are proprietary epitopes and seven are analog (modified) epitopes. The analog epitopes serve to enhance the potency of the T-cell immune response. A phase II trial of the vaccine has been conducted in the USA in HLA-A2-positive patients with late stage (IIIB/IV) NSCLC.

Technology Transfer Spotlight

Offers from Johns Hopkins University

delivery system, 4-phenylbutyrate-containing nanospheres, Johns Hopkins University

Johns Hopkins University licensing offer, Worldwide

Available for licensing from Johns Hopkins University (USA) is a nanosphere delivery technology comprising

4-phenylbutyrate and other drugs that correct defective intracellular protein localization. 4-phenylbutyrate induces transcription of certain promoters, has a remedial effect on proteins aberrantly localized within cells, and causes cells to developmentally differentiate. The formulations allow the delivery of drugs at lower concentrations.

For further information on the opportunities available, contact:

Laura Mitchell
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100 N. Charles St.
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USA

Tel: +1 410 516 4969
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delivery system, aerosolized polyether-anhydride polymers, Johns Hopkins University

Johns Hopkins University licensing offer, Worldwide

Researchers at Johns Hopkins University (USA) are developing aerosolized polyether-anhydride polymers comprising polyethylene glycol (PEG), sebacic acid (SA) and 1,3-bis(carboxyphenoxy)propane (CPP) for use in pulmonary drug delivery. The polymers degrade within hours to months. This technology is available for licensing, worldwide.

For further information on the opportunities available, contact:

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delivery system, gelatin/ chondroitin sulfate, Johns Hopkins University

Johns Hopkins University licensing offer, Worldwide

Researchers at Johns Hopkins University (USA) are developing an injectable controlled-release delivery system that utilizes the coacervation of gelatin and chondroitin sulfate to encapsulate drugs in microspheres. The system has potential application in the delivery of cytokines for cancer vaccination and anti-inflammatory agents for intra-articular delivery in the treatment of osteoarthritis. The delivery system is available for licensing, worldwide.

For further information on the opportunities available, contact:

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Products & Biotechnology

alemtuzumab

Genzyme clinical data (Phase II) (multiple sclerosis)

On 14 April 2011 Genzyme reported five-year data from a randomized, open-label phase II trial, designated CAMMS223, of alemtuzumab (MabCampath; CAMPATH) in

patients with early, active, relapsing-remitting multiple sclerosis (RRMS). The results showed that an estimated 65% of patients who received alemtuzumab were free of clinically active disease, compared to 27% of patients who received the active comparator, a recombinant interferon beta-1a (REBIF) (p less than 0.0001). An estimated 72% of patients were relapse-free in the alemtuzumab group, compared with 41% in the interferon beta-1a group, and an estimated 87% of alemtuzumab-treated patients were free of sustained accumulation of disability, compared with 62% who received interferon beta-1a. The trial also demonstrated that patients receiving alemtuzumab were more than twice as likely to experience a sustained improvement in visual contrast sensitivity than patients receiving interferon beta-1a.

Alemtuzumab, a humanized rat leukemic monoclonal antibody, is available for the treatment of B-cell chronic lymphocytic leukemia in a number of major markets worldwide, including several EU countries and the USA. The agent is being evaluated in two ongoing phase III trials in patients with RRMS, and Genzyme anticipates filing for EU and US approval early 2012.

AM 152

Amira Orphan Drug, USA (idiopathic pulmonary fibrosis)

The US FDA has granted AM 152 Orphan Drug designation for the treatment of idiopathic pulmonary fibrosis, Amira announced on 19 April 2011.

Amira is developing AM 152, an oral lysophosphatidic acid 1 (LPA1) receptor antagonist, for the treatment of fibrotic diseases such as idiopathic pulmonary fibrosis, scleroderma, kidney and liver fibrosis, and metastatic cancers. A phase I trial of AM 152 in healthy volunteers initiated in October 2010 in the USA; a phase II trial is expected to begin by the end of 2011 or in early 2012.

bupropion + naltrexone

Orexigen clinical data (Phase III) (obesity)

On 4 April 2011 Orexigen announced data from the COR II ABPM sub-study (of the phase III COR II trial), evaluating

CONTRAVE in 182 of 1496 overweight and obese patients from the main trial. At week 52, patients dosed with CONTRAVE achieved 7.5% weight loss compared with 2.5% weight loss in the placebo group (p less than 0.001). At week 56 there were improvements in waist circumference (-7.5 cm with CONTRAVE compared with -2.3 cm in the placebo group; p less than 0.001), hs-CRP (-40.7% with CONTRAVE compared with -2.4% in the placebo group; p less than 0.01) and HDL-C (+4.4 mg/dL with CONTRAVE compared with -0.6 mg/dL in the placebo group; p less than 0.01). Overweight and obese patients maintained normal 24-h circadian patterns over one year of treatment with CONTRAVE.

Orexigen is developing CONTRAVE, a proprietary fixed-dose combination of bupropion, a noradrenaline/dopamine reuptake inhibitor, and naltrexone, an opioid receptor antagonist. Orexigen filed an NDA with the US FDA for CONTRAVE for the treatment of obesity in March 2010; the FDA issued a Complete Response letter in January 2011 stating that prior to approval, further data is needed to show that the risk of major adverse cardiovascular events in overweight and obese subjects treated with CONTRAVE does not negatively affect its benefit-risk profile.

ChronVac-C & TG 4040

ChronTech, Transgene and Inovio Pharmaceuticals establish collaboration

ChronTech, Transgene and Inovio Pharmaceuticals reported on 18 April 2011 that they have signed a collaboration agreement to conduct a phase I trial to assess the safety and immunogenicity of a vaccination strategy involving ChronTech's ChronVac-C, delivered by electroporation using Inovio Pharmaceuticals' MEDPULSER DNA delivery system, as the prime, and Transgene's TG 4040 as the boost. The trial, which is expected to start in 2011, will enroll 12 treatment-naïve patients with chronic hepatitis C virus (HCV) infection at a site in Germany. Aside from contributing their respective products, each company will contribute equally to costs relating to the trial.

ChronVac-C, a therapeutic gene-based (DNA plasmid) vaccine, has been evaluated in a phase I/II trial in patients with HCV infection. TG 4040, a therapeutic vaccine that is based on the MVA virus carrying and expressing non-

structural proteins (NS3, NS4 and NS5B) of HCV, is under phase II evaluation in combination with standard of care in patients with HCV infection.

CicloMulsion

NeuroVive phase change III, Europe (reperfusion injury)

NeuroVive reported on 19 April 2011 that the first patient has been enrolled in a double-blind, placebo-controlled, investigator-initiated phase III trial, sponsored by Hospices Civils de Lyon (France), to assess the ability of CicloMulsion to protect cardiac tissue in 1000 patients undergoing percutaneous coronary intervention (PCI) for acute myocardial infarction. The trial, designated CIRCUS (does Cyclosporin improve Clinical Outcomes in ST elevation myocardial infarction patients?) is being conducted in France and other European countries. Several clinical parameters will be assessed, including left ventricular function, blood markers of myocardial infarction, quantitative assessment of myocardial infarction size and clinical status of the patients after completion of PCI. There will be an 18-month enrollment period and each patient will be followed up for 12 months.

CicloMulsion, an intravenous, Cremophore-free formulation of ciclosporin, is being developed for the prevention of reperfusion injury in patients with myocardial infarction.

COTI 2

Critical Outcome Technologies preclinical evaluation, Canada (solid tumor)

On 12 April 2011 Critical Outcome Technologies announced that, following licensing discussions, it has initiated an experimental program designed to optimize the licensing value of COTI 2. This includes a pharmacodynamic xenograft study designed to confirm Akt/Akt2 as a target for COTI 2; this study is designed to demonstrate a pharmacodynamic relationship between blood levels of orally administered COTI 2 and the level of phosphorylated Akt/Akt2 in tumors from COTI 2-treated animals compared with control animals. In addition, the program will include completion of an optimal oral formulation of COTI 2 that can be used

for IND-enabling experiments/future phase I trials, and, a 28-day acute toxicity IND-enabling study in two animal species using an optimal formulation of COTI 2.

Critical Outcome Technologies is developing COTI 2, a small molecule inhibitor of Akt/protein kinase B phosphorylation which causes apoptosis by activating caspase 9, for the oral treatment of solid tumors such as small cell lung cancer (SCLC), endometrial cancer and ovarian cancer, and possibly colorectal and pancreatic cancers.

dalbavancin

Durata initiates pivotal phase III trial

On 19 April 2011 Durata announced the initiation of a global, randomized, double-blind, double-dummy, pivotal phase III trial, designated DISCOVER 1, comparing the safety and efficacy of dalbavancin (BI 397) with vancomycin in approximately 556 patients with acute bacterial skin and skin structure infections (abSSSI). The trial is being conducted under a Special Protocol Assessment (SPA) that had been agreed with the US FDA. Patients will be randomized to receive one of two doses of dalbavancin in a 30-min infusion. These will be administered once weekly compared with dosing every 10 to 14 days with the comparator regimen. Patients who will be randomized to vancomycin will be able to switch to oral linezolid after three days of vancomycin therapy. Clinical response measurements will be taken 48 to 72 h post-study initiation and on days 14 and 15 post-study initiation.

Dalbavancin, a cell wall synthesis inhibitor and an injectable semisynthetic derivative of the naturally occurring glycopeptide A 40926, has been evaluated by Vicuron (now Pfizer) in three phase III trials in the treatment of complicated and uncomplicated skin and soft tissue infections, including those infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

DexaSite & AzaSite Plus

InSite Vision provides update on development

InSite Vision announced on 14 April 2011 that it has received eight minor recommendations from the US FDA under its Special Protocol Assessment (SPA) process

regarding the design of the company's planned phase III trial of AzaSite Plus and DexaSite in patients with blepharitis. InSite Vision has filed a response accepting all of the FDA's recommendations.

InSite Vision is developing DexaSite (ISV 305), a 0.1% eye-drop formulation of dexamethasone, to rapidly reduce the signs and symptoms of non-bacterial blepharitis, and AzaSite Plus (ISV 502), a fixed combination comprising the antibiotic azithromycin and the corticosteroid dexamethasone, for the treatment of bacterial blepharitis. Both agents are formulated using DuraSite, InSite Vision's proprietary drug delivery system for topical ophthalmic administration. Phase III evaluation of both agents has been conducted in patients with blepharoconjunctivitis.

emtricitabine + tenofovir disoproxil

FHI trial stopped (Phase III), Kenya, South Africa, Tanzania (HIV infection) (pre-exposure prophylaxis)

FHI reported on 18 April 2011 that it has decided to stop a trial of TRUVADA it was conducting for the pre-exposure prophylaxis of HIV infection in uninfected, at-risk women. In an interim data analysis of 1951 subjects that have been enrolled in Kenya, South Africa and Tanzania, the Independent Data Monitoring Committee advised that it is highly unlikely the trial will demonstrate the effectiveness of TRUVADA in preventing HIV infection. A total of 56 new infections occurred; there was no difference in the number of new infections between the TRUVADA and placebo groups. Further analyses will continue.

Gilead Sciences has developed TRUVADA, an oral once-daily antiretroviral therapy for HIV infection, combining tenofovir disoproxil, a nucleotide reverse transcriptase inhibitor, with emtricitabine, a nucleoside reverse transcriptase inhibitor. TRUVADA is available in many major markets worldwide, including in the USA and EU, for the treatment of HIV infection. A pre-exposure prophylaxis trial has been conducted in men who have sex with men by the National Institute of Allergy and Infectious Diseases (NIAID) of the US National Institutes of Health. Results showed that TRUVADA significantly reduced the risk of HIV infection, compared with placebo.

ferric citrate

Japan Tobacco, Torii phase change III, Japan (hyperphosphatemia)

Japan Tobacco, Torii, Keryx milestone payment

Keryx reported on 18 April 2011 that Japan Tobacco and its subsidiary Torii have begun a phase III clinical program in Japan to assess ferric citrate (ZERENEX) in the treatment of hyperphosphatemia in patients with end-stage renal disease. This has triggered a non-refundable US\$5 million milestone payment from Japan Tobacco and Torii to Keryx, which is payable within 30 days. Under an agreement signed in September 2007, Keryx granted Japan Tobacco and its subsidiary Torii exclusive Japanese rights to develop and commercialize ferric citrate for the treatment of hyperphosphatemia.

Keryx is conducting phase III evaluation of ferric citrate (an agent that binds to phosphorus forming nonabsorbable complexes) in the USA in patients with hyperphosphatemia on dialysis. Ferric citrate is also being developed by Panacor under the trade name NEPHOXIL. Keryx acquired worldwide rights to the agent, excluding the Asia-Pacific region, from Panion & BF Biotech (the parent company of Panacor) in February 2006.

ganaxolone

Marinus trial planned (Clinicals), USA (fragile X syndrome)

On 13 April 2011 Marinus announced that the US Department of Defense has awarded the company a US\$3 million grant to conduct a clinical study of ganaxolone in the treatment of fragile X syndrome. The study will be conducted at the University of California at Davis (UCD;USA). 60 children between six and 17 years old will be enrolled to evaluate the safety and efficacy of ganaxolone in the treatment of behaviors and anxiety associated with fragile X syndrome.

Ganaxolone, a synthetic analogue of the neurosteroid allopregnanolone (a metabolite of progesterone), is being developed as a potential treatment for epilepsy, post traumatic stress disorder and fragile X syndrome. Phase II

evaluation in the treatment of epilepsy has completed.

ganitumab

Takeda and Millennium initiate Japanese portion of phase III trial

On 14 April 2011 Takeda and its subsidiary Millennium announced that they are participating in Amgen's randomized, double-blind, placebo-controlled phase III trial of ganitumab (AMG 479), and have initiated the Japanese portion of this study. An estimated 825 patients with pancreatic adenocarcinoma are expected to be enrolled worldwide, and will receive ganitumab or placebo, in addition to gemcitabine. The primary endpoint is overall survival.

Ganitumab, a fully human monoclonal antibody targeted to IGF1, has been administered in phase II trials to patients with a variety of solid tumors, including breast, colorectal, ovarian and small cell lung cancers, refractory Ewing's family tumor and desmoplastic small round cell tumors. Amgen licensed certain development and commercialization rights to ganitumab in Japan to Takeda in February 2008.

GLPG 0259

Galapagos trial stopped (Phase II), Europe (rheumatoid arthritis)

Galapagos announced on 15 April 2011 the discontinuation of a phase II trial of GLPG 0259 in rheumatoid arthritis, following an interim analysis of safety and efficacy data from the first 30 patients. No serious adverse events or safety signals were reported; however, an Interim Review Committee recommended discontinuation of the study due to limited efficacy potential of the agent in this trial. A decision regarding the next steps for GLPG 0259, including its development for other indications, will be taken upon full analysis of the data for the agent.

GLPG 0259, an inhibitor of the protein kinase MAPKAPK5, was discovered under a multi-target alliance agreement with Janssen Pharmaceutica, under which the latter company may select up to 12 of Galapagos' internally identified targets to be used for the development of rheumatoid arthritis therapeutics.

hyaluronidase (human recombinant)

Halozyme clinical data (Phase I) (diabetes)

On 15 April 2011 Halozyme reported preliminary results from the first stage of a phase I trial of its hyaluronidase (human recombinant) (rHuPH20) combined with insulin aspart, administered as a continuous sc insulin infusion over 72 h with an insulin pump, compared with insulin aspart alone in patients with type I diabetes. A total of 13 patients have been enrolled so far in this first stage of the study, and enrollment of an additional five patients is ongoing. Results showed a 64% greater cumulative insulin exposure during the first 60 min following a bolus infusion for the insulin aspart plus rHuPH20 formulation (Aspart-PH20), compared with insulin aspart alone (p less than 0.0001). A 42% decrease of insulin exposure beyond 2 h after the bolus was observed for Aspart-PH20, compared with insulin aspart alone ($p=0.0003$). With a euglycemic clamp procedure, Aspart-PH20 demonstrated a 20% greater action in the first 2 h compared with insulin aspart alone ($p=0.047$), with 37% less insulin action beyond 4 h after injection ($p=0.008$). Safety and adverse event profiles of Aspart-PH20 and insulin aspart were comparable; both treatments were well tolerated. Further data are expected in 2011.

rHuPH20, a synthetic human enzyme, facilitates the penetration and diffusion of other drugs by temporarily degrading hyaluronic acid, a space-filling gel-like substance found in tissues throughout the body. The product, under the trade name HYLENEX, was launched in June 2006 in the USA as an adjuvant to increase absorption and dispersion of other injected drugs; in October 2009, the product was launched in the USA for use in pediatric hydration.

Llama antibodies, National Cheng Kung University/National Research Council of Canada

National Research Council of Canada, National Cheng Kung University provide development update

The National Cheng Kung University (Taiwan) announced

on 15 April 2011 that, under a collaboration with the National Research Council of Canada, they have discovered single-domain antibodies from llamas that target a specific cancer cell membrane glycoprotein. Llama antibodies are smaller than human IgG (1/10), resistant to extreme temperature and pH environments and can spontaneously fold back to a functional conformation. The researchers have discovered a class of single-domain antibodies that inhibited growth, neoangiogenic activity, metastasis and tumor microenvironment modulation in pancreatic and breast cancer cells.

MAB, botulinum neurotoxins, Morphotek

Morphotek awarded grant from US Department of Defense

Morphotek announced on 12 April 2011 that the US Department of Defense has awarded the company a US\$947 000 grant to support the continued development of therapeutic monoclonal antibodies targeting botulinum neurotoxins; the grant is part of a US defense initiative to protect citizens and military personnel from such biowarfare agents. Morphotek received a US\$2.3 million grant from the US Department of Defense in 2007 to support the initial development of these agents. The program is being conducted in collaboration with the US Army Medical Research Institute for Infectious Diseases.

TB 403

Roche phase change I, Switzerland (hepatocellular carcinoma)

On 14 April 2011 BioInvent reported that its development partner, Roche, has initiated a phase Ib trial evaluating TB 403 (RG 7334) in combination with sorafenib in approximately 60-70 patients with primary hepatocellular carcinoma. The primary endpoint will be establishing doses for further parts of the trial, safety, pharmacokinetics and pharmacodynamics.

TB 403 is a monoclonal antibody angiogenesis inhibitor targeting placental growth factor (PlGF). The agent has potential application in the treatment of tumors, proliferative

retinopathies, age-related macular degeneration (AMD), inflammation and abdominal adhesion. Phase I evaluation has been conducted in patients with solid tumors including colorectal cancer and ovarian cancer. A phase Ib/II trial in patients with glioblastoma multiforme is planned. In June 2008, Roche licensed exclusive worldwide rights to develop and commercialize TB 403 from BioInvent.

MDX 1303

PharmAthene provides development update

On 13 April 2011 PharmAthene announced that patient dosing has been completed in a randomized, placebo-controlled, double-blind, single dose-escalating phase I trial of MDX 1303 (VALORTIM) in the USA. A total of 28 healthy volunteers received either MDX 1303 (1, 5 or 10 mg/kg iv) or placebo. No infusion-related adverse reactions have been reported. The safety follow-up is expected to complete in third quarter 2011 with final unblinded results available in 2011. This trial was initiated after the US FDA lifted a partial clinical hold on the development of the agent in December 2010; this partial clinical hold followed a serious adverse event experienced by one subject receiving MDX 1303 in a phase I trial.

MDX 1303, a fully human monoclonal antibody targeting anthrax protective antigen, is being jointly developed for the prophylaxis and treatment of inhalation anthrax infection by PharmAthene and Medarex (a wholly-owned subsidiary of Bristol-Myers Squibb) under a December 2004 agreement.

mipomersen

Genzyme clinical data (Phase III) (hypercholesterolemia)

On 5 April 2011 Genzyme reported additional clinical data from a phase III trial evaluating mipomersen in patients with high cholesterol levels while on lipid-lowering therapy. Patients treated with mipomersen had an average low-density lipoprotein cholesterol (LDL-C) reduction of 101 mg/dL as well as reductions in apolipoprotein B (36% compared with 11% increase in placebo group), lipoprotein a (33% compared with 1% placebo group),

non high-density lipoprotein (HDL) cholesterol (34% compared with 14% increase in placebo group) and total cholesterol (28% compared with 11% increase in placebo group; all p values less than 0.001). Adverse events included injection site reactions (90% mipomersen; 32% placebo) and flu-like symptoms (46% mipomersen; 21% placebo).

Genzyme also reported that during the post-treatment follow-up period of a phase III trial of mipomersen in patients with high cholesterol at high risk for coronary heart disease (CHD), one patient died due to liver failure, acetaminophen toxicity, pneumonia and myocardial infarction 149 days after receiving the last dose of mipomersen.

Genzyme is developing a subcutaneous formulation of mipomersen, a second-generation antisense oligonucleotide that targets ApoB-100, for the treatment of hypercholesterolemia. Genzyme plans to file for EU approval of mipomersen for the treatment of patients with homozygous familial hypercholesterolemia (hoFH), and severe heterozygous familial hypercholesterolemia (heFH), in first half 2011. The company also expects to file for US approval for the treatment of hoFH second half 2011.

MODUFOLIN

Isofol Medical begins phase I/II trial in rectal cancer

Isofol Medical reported on 15 April 2011 that the first patient has been enrolled in a single-center, open-label, extended feasibility phase I/II trial (designated LARS2) of MODUFOLIN (10, 50 or 100 mg/m²) in combination with pemetrexed (500 mg/m²) in 43 to 58 chemo-naïve patients with newly diagnosed operable rectal cancer.

MODUFOLIN, a folate-based agent, is being developed for use in increasing the efficacy and reducing side effects of antimetabolite cancer chemotherapeutics. The agent is the key active metabolite of leucovorin. MODUFOLIN stabilizes the binding of certain antimetabolites to the target thymidylate synthase. In contrast to leucovorin, enzymatic metabolic activation is not required for MODUFOLIN (which allows for a greater metabolic effect).

multidrug-resistant bacterial infection therapy, Trius/LLNL

Trius is awarded a research contract

Trius announced on 15 April 2011 that it has been awarded a research contract by Lawrence Livermore National Laboratory (LLNL), part of the US Department of Energy's National Nuclear Security Administration, for the co-development of therapies for multidrug-resistant bacterial infections. The program will target cell wall biosynthesis. Trius' expertise in structure-guided medicinal chemistry and LLNL's computational chemistry, biodefense microbiology and pharmacology expertise will be used. LLNL may pay Trius up to US\$3 million over three years to support the company's development efforts.

NEUPRO

UCB clinical data (Phase II) (restless leg syndrome)

UCB reported data on 14 April 2011 from a five-year, open-label, prospective follow-up of a placebo-controlled phase II trial of NEUPRO, a transdermal patch formulation of rotigotine, conducted in Germany, Austria and Spain in patients with restless leg syndrome (RLS). Patients were titrated to an optimal dose of rotigotine (0.5, 1, 2, 3 or 4 mg/24 h) and evaluated for safety and efficacy periodically. Of the 295 patients enrolled in the study, 126 completed the five-year follow-up. Results showed an improvement in the International Restless Legs Syndrome Study Group Rating (IRLS) score from 27.8 at baseline to 9.0 after five years in rotigotine-treated patients. Potential augmentation was identified in 145 patients (49.2%); this was confirmed in 69 patients (24.3%) according to the Max Planck Institute (MPI) diagnostic criteria for augmentation. Clinically significant augmentation was observed in 13.2% of patients (n=39), compared with 5.1% of patients receiving rotigotine 1, 2 or 3 mg/24 h (EU-approved doses). Among patients showing clinically significant augmentation, 61.5% were receiving rotigotine 4 mg/24 h, the highest unapproved dose of the agent, and 61.5% experienced their first episode after one year. Newly diagnosed augmentation decreased in frequency over time, and new episodes were more frequently clinically significant.

12 patients discontinued the study due to augmentation.

UCB is developing the transdermal patch containing the dopamine D₂ agonist rotigotine as a treatment for early- and late-stage Parkinson's disease, RLS and fibromyalgia syndrome. Rotigotine is administered via a transdermal silicone-based once-daily patch, worn during waking hours for a period of 21 days. The product is available in the EU for the treatment of Parkinson's disease and moderate-to-severe idiopathic RLS.

NP 2

Diamyd Medical clinical data (Phase I) (pain)

On 11 April 2011 Diamyd Medical reported additional data from the dose-escalating phase I trial evaluating the safety and efficacy of three different doses of NP 2 in patients with chronic pain due to malignancy. Sustained pain relief was observed in the middle and high-dose cohorts in both pain measurement methods used in the study; Numeric Rating Scale (NRS) 0-10 and the Short Form McGill Pain Questionnaire (SF-MPQ). Over the first four weeks, there was a decrease of approximately 80% in the combined average weekly NRS scores in the highest-dose cohort. NP 2 was well tolerated, and no treatment-related adverse events were observed during the four-month evaluation period in the ten patients enrolled.

NP 2 is a gene therapy comprising a replication-defective herpes simplex virus (HSV) vector incorporating the human enkephalin gene, and utilizes Diamyd Medical's Nerve Targeting Drug Delivery System (NTDDS) which enables delivery of the agent directly to the site of pain. A phase II trial of NP 2 in patients with severe intractable cancer pain is ongoing.

NT 501

Neurotech clinical data (Phase II) (AMD)

On 5 April 2011 Neurotech announced clinical data from a phase II trial evaluating NT 501 in 51 patients with geographic atrophy associated with dry age-related macular degeneration (AMD). Patients showed a dose-dependent increase in retinal thickness followed by visual acuity stabilization of 96.3% in the high-dose group, 83.3% in

the low-dose group and 75% in the placebo group. Data from sub-group analysis showed that 100% of patients who had better vision at baseline (20/63 or better) on high-dose NT 501 (n=10) maintained visual acuity stabilization, compared with 55.6% (p=0.033) in the combined low-dose and placebo group (n=9). In addition, there was a 0.8 mean letter gain in the high-dose group compared with a 9.7 mean letter loss in the combined low-dose and placebo groups. NT 501 caused no serious adverse events and surgical procedures were well tolerated.

NT 501 is an intraocular implant containing human retinal epithelial cells genetically modified to produce ciliary neurotrophic factor (CNTF). The implant utilizes Neurotech's Encapsulated Cell Technology to deliver CNTF directly to the back of the eye. Phase II/III trials for the treatment of retinitis pigmentosa have been conducted.

NX 1207

Nymox clinical data (Phase II) (benign prostatic hyperplasia)

On 13 April 2011 Nymox reported results from a long-term 39- to 45-month follow-up to a phase II trial (NX02-0016) of NX 1207 conducted in the USA in patients with benign prostatic hyperplasia (BPH). The follow-up study assessed American Urological Association BPH Symptom Index scores in available blinded subjects from the original trial; this patient group comprised 58% of the subjects who had received 2.5 mg of NX 1207 or a control treatment (finasteride). The results showed that 54% of patients who had received NX 1207 at a dose of 2.5 mg in trial NX02-0016 had required no further medical or surgical treatments for their BPH at any time during the follow-up period. There was a mean improvement of 11.5 points in symptom scores at 39-45 months among patients who received 2.5 mg NX 1207; this increase was statistically significant. Only one subject in the control group had not required any additional BPH treatments. No significant drug-related safety problems were reported by any subjects in the long-term follow-up, consistent with the findings from trial NX02-0016.

NX 1207 is being developed for the treatment of BPH. Phase III evaluation of NX 1207 is ongoing in the USA in this indication, administered by intraprostatic injection.

omecamtiv mecarbil

Cytokinetics, Amgen initiate phase I Ib trial in heart failure

On 19 April 2011 Cytokinetics announced that enrollment has opened for an international, randomized, double-blind, placebo-controlled phase I Ib trial of iv omeamtiv mecarbil in patients with left ventricular systolic dysfunction who are hospitalized for acute heart failure. The trial, being conducted by Amgen in collaboration with Cytokinetics, is expected to enroll approximately 600 patients in three sequential ascending-dose cohorts. The effect on dyspnea following 48 h treatment is the primary endpoint of the trial. Secondary endpoints include safety and tolerability, additional measures of dyspnea, patients' global assessments, change in N-terminal pro brain-type natriuretic peptide, and short-term clinical outcomes. The relationship between plasma concentrations of omeamtiv mecarbil and echocardiographic parameters will also be evaluated.

Omeamtiv mecarbil, a small molecule activator of cardiac myosin, has been evaluated in multiple phase I and IIa trials; oral and iv formulations have been evaluated. Amgen exercised an option to acquire global rights (excluding Japan) to the agent from Cytokinetics in May 2009.

oregovomab & rintatolimod

Quest PharmaTech and Hemispherx sign clinical development agreement

Quest PharmaTech and Hemispherx have entered into a clinical development agreement to evaluate the anticancer efficacy of the former's oregovomab (OraVex) administered in combination with the latter's rintatolimod (AMPLIGEN) in a 30-patient clinical trial which will be conducted in the USA and Canada in 2011. Under the terms of the agreement, which was announced by Quest PharmaTech on 14 April 2011, both companies will fund the study equally. Hemispherx will provide necessary technical expertise and data, and will store and maintain the clinical supply of oregovomab.

Rintatolimod, mismatched double-stranded RNA, is being developed by Hemispherx as a therapy for chronic fatigue

syndrome and for viral infections, such as HIV infection. The agent also has potential as a therapy for cancer. Quest PharmaTech is developing the murine monoclonal antibody oregovomab, which is targeted to cancers expressing the CA 125 tumor antigen, as a therapeutic cancer vaccine. Two phase III trials, which did not meet their endpoints, have been conducted in the USA in patients with ovarian cancer.

pomaglumetad methionil

Lilly phase change III, Croatia, Puerto Rico, Romania, Russia, USA (schizophrenia)

In its first quarter results 2011, reported on 18 April 2011, Lilly announced that it has initiated a phase III program for its mGluR2/3 agonist prodrug, pomaglumetad methionil, in the treatment of schizophrenia. Phase II evaluation of the agent has been conducted.

PRT 201

Proteon phase change II, USA (surgery)

Proteon announced on 14 April 2011 that enrollment has begun in a phase II trial of PRT 201 administered to chronic kidney disease (CKD) patients immediately after surgery for arteriovenous fistula (AVF) creation in preparation for hemodialysis. This follows the successful completion of a phase I/II trial in 66 AVF patients.

PRT 201, a human recombinant elastase, is being developed to improve both the immediate and long-term success of hemodialysis access, bypass graft and angioplasty procedures. The agent can be applied topically to exposed vessels during surgery, or injected through angioplasty catheters, to produce dilation of the vessels.

RGN 259

RegeneRx preclinical data

RegeneRx reported preclinical data on 13 April 2011 from a study evaluating four active concentrations of RGN 259 compared with three control groups; one negative and two positive controls. The animals were treated with the

agent for nine days following the inducement of moderate and severe dry eye. After six days of treatment, two concentrations of RGN 259 demonstrated a statistically significant reduction in corneal fluorescein staining (used to determine extent of damage to the cornea) in murine models with moderate dry eye. In the same murine models after inducement of severe dry eye, treatment with RGN 259 for three additional days showed a greater reduction of corneal staining compared with control groups; however, this result was not statistically significant. No adverse safety events were observed.

RGN 259 is an ophthalmic eye drop formulation of thymosin beta 4 peptide, in development as a therapy to aid corneal healing in conditions such as dry eye syndrome. A phase II physician-sponsored trial of the agent in patients with dry eye syndrome is under way.

tafamidis

Pfizer clinical data (Phase II/III) (amyloidosis)

On 13 April 2011 Pfizer reported data from an 18-month pivotal phase II/III trial (Fx-005) of tafamidis (Fx 1006A) and its open-label, 12-month extension trial (Fx-006) conducted in patients with transthyretin familial amyloid polyneuropathy (TTR-FAP). The Fx-005 trial did not meet its co-primary endpoints but did meet statistical significance in a predefined secondary analysis. Adverse events included diarrhea, upper abdominal pain, urinary tract infection and vaginal infection. In the Fx-006 trial, patients treated with tafamidis for 30 months had less neurological deterioration than those starting treatment 18 months later; there was a 55.9% preservation of function as measured by the Neuropathy Impairment Score-Lower Limb (mean change from baseline of 3 compared with 6.8, respectively ($p=0.04$)). Patients treated with tafamidis over 30 months also showed preservation in large (66% preservation or 1.6 compared with 4.7; $p=0.007$) and small nerve fiber function (45.5% or 1.2 compared with 2.2; p =not significant). Patients who started treatment 18 months later showed a slowing of disease progression. There were no new adverse events compared with the Fx-005 study and no patients discontinued from this trial due to adverse events.

Tafamidis, a transthyretin stabilizer, is pending approval in the EU for the treatment of TTR-FAP. The agent has received Orphan Drug designation in the USA and EU, and Fast Track designation in the USA for this indication.

telaprevir

Tibotec Pharmaceuticals, Vertex results update

On 31 March 2011 Tibotec Pharmaceuticals (a Johnson & Johnson company) and Vertex reported final data from a phase III trial of telaprevir, designated REALIZE, in patients with chronic hepatitis C virus (HCV) infection who failed to achieve a sustained viral response (SVR) with prior therapy. In this 48-week trial, patients received telaprevir, peginterferon alfa-2a and ribavirin for 12 weeks, followed by 36 weeks of peginterferon alfa-2a and ribavirin alone (simultaneous start); or four weeks of peginterferon alfa-2a and ribavirin alone, followed by 12 weeks of telaprevir combination treatment, followed by 32 weeks of peginterferon alfa-2a and ribavirin alone (delayed start); or peginterferon alfa-2a and ribavirin, plus placebo for 48 weeks (control).

In the telaprevir simultaneous start arm (n=266), SVR was achieved in 83% of relapsers and 41% of nonresponders (p less than 0.001). In the telaprevir delayed start arm (n=264), SVR was achieved in 88% of relapsers and 41% of nonresponders (p less than 0.001). In the peginterferon alfa-2a and ribavirin alone arm (n=132), SVR was achieved in 24% of relapsers and 9% of nonresponders (p less than 0.001). The safety and tolerability profile for telaprevir was consistent with previous phase III trials. The most common adverse events leading to discontinuation were rash (4%) and anemia (3%). The most common adverse events in the telaprevir groups, the majority of which were mild-to-moderate in severity, were fatigue, pruritus, headache, rash, nausea, influenza-like illness, anemia, insomnia, diarrhea and fever. All patients in the telaprevir-treated groups experienced substantial improvements in SVR, regardless of IL28B genotype, compared with peginterferon alfa-2a and ribavirin alone. Of the 662 patients who were enrolled in the trial, 527 were tested for their IL28B genotype. Overall SVR rates in the telaprevir-treated groups were 79%, 60% and 61% for patients with the CC, CT and TT IL28B genotype variations,

respectively. In patients receiving peginterferon alfa-2a and ribavirin alone, overall SVR rates were 29%, 16% and 13% for patients with the CC, CT and TT IL28B genotype variations, respectively.

Vertex is developing telaprevir, an inhibitor of hepatitis C virus (HCV) NS3-4A protease, for the treatment of HCV infection. Regulatory submissions for the agent are pending in the USA, the EU, Canada and Japan. Phase III evaluation of telaprevir is ongoing in various treatment combinations and regimens in several patient populations. Vertex granted Janssen-Cilag, a subsidiary of Johnson & Johnson, exclusive rights to the agent in Europe, South America, the Middle East, Africa and Australia in June 2006. Janssen-Cilag's development and commercialization activities are being conducted by Tibotec Pharmaceuticals.

UISH 001

Beech Tree Labs phase change I/II, USA (urinary incontinence)

Beech Tree Labs reported on 13 April 2011 that it has begun an FDA-approved phase I/IIa trial of UISH 001. The placebo-controlled trial will involve 60 patients with urinary incontinence. The agent showed efficacy in treating urge, stress and mixed incontinence in an IRB-approved blinded study.

Conferences

American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA

ABDNAZ

RadioRx preclinical data

Data from preclinical studies of ABDNAZ were presented at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. ABDNAZ induced

dose- and time-dependent reactive oxygen species (ROS) generation, DNA damage and apoptosis in HT29 and SCC VII tumor cells. The agent was well tolerated at doses that induced tumor regression, with no dose-limiting toxicities observed. ABDNAZ was as cytotoxic to tumor cells as cisplatin (IC₅₀ of 2.6 +/- 1.6 mcM and 4.4 +/- 2.2 mcM, respectively), and more cytotoxic to tumor cells than cisplatin and tirapazamine under hypoxic conditions. The antiproliferative effect on SCC VII cells in mice was similar between ABDNAZ and cisplatin; ABDNAZ was significantly better tolerated than cisplatin at equipotent doses and inhibited tumor growth without systemic toxicity at sub-maximum tolerated doses in this model. ABDNAZ enhanced the efficacy of radiation and the therapeutic index of radiation therapy when combined with local tumor radiation.

RadioRx is developing ABDNAZ, a dinitroazetidine compound derived from highly energetic material, as a stand-alone chemotherapy for cancer and as a radiation sensitizer. Preclinical evaluation is under way, and clinical trials are expected to initiate before end 2011.

adarotene prodrug, Sigma-Tau

Sigma-Tau preclinical data

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Sigma-Tau reported preclinical data for an adarotene prodrug, under development as a back-up compound to adarotene. In CD1 nude mice with NCI-H460 NSCLC (nonsmall cell lung cancer) sc xenografts, body weight loss (BWL) and tumor volume index (TVI) were 10% and 37%, respectively, for the adarotene prodrug (18 mg/kg, iv, qdx3/wx2w) compared with 9% and 34% for adarotene (25 mg/kg, po, qdx3/wx2w). In CD1 nude mice with sc A431 (epidermoid skin carcinoma) xenografts, BWL and TVI values for the adarotene prodrug at 37 mg/kg and 10 mg/kg (iv, qdx3/wx2w) were 18% and 59%, and 0% and 34%, respectively, compared with 12% and 36% for adarotene (25 mg/kg, po, qdx3/wx2w). Pharmacokinetic studies in 5-6 week old female CD1 mice showed that the adarotene prodrug was completely hydrolyzed to adarotene within 5 min.

AF 802

Chugai preclinical data

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Chugai presented preclinical data for AF 802 (CH 5424802), an orally available EML4-ALK inhibitor that has potential in the treatment of cancers expressing gene alterations of ALK. AF 802 inhibited ALK with an IC₅₀ of 1.9 nM, and a K_d of 2.4 nM. The agent demonstrated selective antitumor activity against ALK-driven cancers in vitro and in vivo, including nonsmall cell lung cancer (NSCLC) cells expressing EML4-ALK fusion and anaplastic large-cell lymphoma (ALCL) cells expressing NPM-ALK fusion. AF 802 also inhibited C1156Y and L1196M, crizotinib-resistant mutations of EML4-ALK. The agent is being evaluated in phase I/II trials in Japan in patients with NSCLC.

anticancer agents, University of California at Davis

University of California at Davis conducting discovery program, USA (cancer)

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, researchers at the University of California at Davis (USA) reported that they are investigating a series of novel anticancer agents. The compounds were identified by ultra-high-throughput multiplex screening of a one-bead-one compound (OBOC) small molecule combinatorial library against an M13 phase display cDNA expression proteome library derived from the T-lymphoma Jurkat cell. Agents from the series killed both Jurkat and HepG2 hepatocarcinoma cells, with IC₅₀s of 15–80 mcM. Further work is under way to optimize lead compounds and to further examine their structure–activity relationship.

API 31510

Cytotech Labs preclinical data

Cytotech Labs partnering opportunity, Worldwide

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Cytotech

Labs presented preclinical data for API 31510. The agent demonstrated potential as a therapy for CNS leukemia in a rat model of the disease, and as a prophylactic agent to prevent the extravasation of leukemic cells into the CNS. A topical formulation of API 31510 has been evaluated in a phase II trial in basal cell carcinoma (BCC) and a phase I/II trial in squamous cell carcinoma (SCC). In first quarter 2011, a phase I trial began in the USA to assess the iv formulation of the agent in patients with BCC. The agent is also under preclinical evaluation in pancreatic cancer. A phase III trial in patients with BCC, SCC and melanoma is planned. API 31510 is available for partnering, worldwide.

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AZD 5363

AstraZeneca preclinical data

AstraZeneca reported data from preclinical studies of AZD 5363 at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. In breast and prostate cancer cell lines, AZD 5363 inhibited proliferation by inhibiting phosphorylation of a number of AKT substrates, including PRAS40, GSK-3beta and FOXO3a. AZD 5363 induced apoptosis in a subset of these cell lines.

AZD 5363, an Akt inhibitor, is undergoing phase I evaluation in patients with solid tumors.

CR 4056

Rottapharm preclinical data

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Rottapharm presented data from a preclinical study of CR 4056, evaluating the effect of the agent on neuropathic pain induced by subchronic treatment with bortezomib. CR 4056 co-administered with bortezomib prevented the development of allodynia in rats. In animals treated with bortezomib for six and eight weeks, the administration of CR 4056 inhibited the allodynia.

CR 4056, an imidazoline-2 binding site ligand and monoamine oxidase inhibitor, is being developed for the treatment of neuropathic pain and acute nonspecific pain. Preclinical evaluation is ongoing.

CUDC 907

Curis preclinical data

Curis reported data from preclinical studies of CUDC 907, an orally available synthetic small molecule inhibitor of phosphoinositide 3-kinase (PI3K) and histone deacetylase (HDAC), at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. In non-Hodgkin's lymphoma (NHL) Daudi tumor xenografts, CUDC 907 inhibited HDAC, PI3K and MEK-ERK pathways, and induced apoptosis. The agent, at a dose of 50 mg/kg bid, inhibited tumor growth in this model. In vitro, CUDC 907 inhibited proliferation of hematological cancer cell lines; IC₅₀ values ranged from 0.0007 mcM to 0.44 mcM. Preclinical evaluation of CUDC 907 is ongoing in the treatment of cancer.

CVX 19

Pfizer preclinical data

CVX 19 is being developed by Pfizer for the treatment of cancer. The agent was created using the company's CovX-Body technology platform, which combines the structural diversity of small molecules, peptides and oligonucleotides with the long half-life and predictable distribution of

antibody therapeutics. CVX 19 consists of a chemically modified peptide fused to an antibody, and is a fibroblast growth factor receptor 4 (FGFR4) inhibitor. Preclinical data was presented at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. In a competition ELISA, CVX 19 inhibited the binding of FGF19 to FGFR4 with an IC_{50} of 10 nM with no cross-reactivity. The agent had a beta half-life of 55 h in mice. Once-weekly iv administration of CVX 19 demonstrated 30% tumor growth inhibition and reduced FGFR4 signaling through ERK in a staged Colo-205 xenograft model. However, the agent did not inhibit tumor growth in a patient-derived hepatocellular carcinoma xenograft expressing both FGFR4 and FGF19.

efatutazone

Daiichi Sankyo clinical data (Phase I/II) (endocrine cancer)

Initial exploratory results from a phase I trial of efatutazone (CS 7017) in combination with paclitaxel in patients with advanced anaplastic thyroid cancer were presented at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. Patients in the 0.15 mg bid (n=7) and 0.30 mg bid (n=6) efatutazone dose groups had a median time to progression of seven and 14.1 weeks, respectively, and a median survival of 14.1 and 20 weeks, respectively. One patient achieved a partial response, and eight had stable disease. No dose-limiting toxicities were observed at doses up to 0.50 mg bid. Two serious adverse events (grade 4 anemia and anaphylaxis) were potentially related to efatutazone and/or paclitaxel. 13 events of fluid retention and edema, including two grade 3, were reported in eight patients.

Efatutazone, a peroxisome proliferator-activated receptor (PPAR) gamma agonist, is being developed by Daiichi Sankyo. Phase II evaluation of efatutazone alone or in combination with other agents is under way in patients with nonsmall cell lung cancer (NSCLC) and colorectal cancer.

erismodegib

Novartis clinical data (Phase I) (solid tumor)

At the American Association of Cancer Research 102nd

Annual Meeting, 2-6 April 2011, Orlando, USA, Novartis reported results from a phase I trial of erismodegib (LDE 225), conducted in patients with solid tumors. 71 patients received erismodegib orally at doses ranging from 100 to 3000 mg once daily, or 400 and 750 mg twice daily for 28 days, with a single dose seven-day pharmacokinetic run-in before starting the first treatment cycle. The maximum tolerated dose of oral erismodegib is 800 mg daily; at doses up to 800 mg qd, the agent was well tolerated with no dose-limiting toxicities reported. At doses of more than 1500 mg qd or 400 mg bid, dose-limiting toxicities of grade 3/4 increases in plasma creatinine phosphokinase associated with muscle spasm were observed. Grade 1/2 nausea, vomiting, dysgeusia, decreased appetite, diarrhea, myalgia, asthenia, headache, muscle cramps, fatigue and increased plasma creatine kinase were among the most common treatment-related adverse events. C_{max} and AUC(0-24h) increased by three- and six-fold, respectively, on day 15 compared with day 1, with an effective half-life of more than four days (range 1-14 days). Stable disease was achieved in two patients with advanced basal cell carcinoma for more than 22 months (patients receiving erismodegib 200 mg qd) and more than seven months (erismodegib 400 mg bid), respectively. Disease stabilization was also achieved in four patients with other cancers (lung adenocarcinoma, spindle cell sarcoma, breast cancer). Partial responses were observed in three other patients with basal cell carcinoma and one patient with medulloblastoma.

Erismodegib, a smoothed (SMO) inhibitor, is undergoing a phase II trial in patients with sporadic superficial skin basal cell carcinomas, and a phase I/II trial in patients with Gorlin's syndrome.

ETP 47187

Spanish National Cancer Research Centre preclinical data

The Spanish National Cancer Research Centre presented preclinical data for ETP 47187, a dual inhibitor of phosphoinositide 3-kinase (PI3K) and mTOR, at the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA. ETP 47187 exhibited a favorable pharmacokinetic profile and showed

oral and iv bioavailability. The agent demonstrated synergy with PD 0325901 (MEK inhibitor) and lapatinib (EGFR/HER2 inhibitor) in A549 lung cancer cells, as well as with docetaxel in SKOV3 ovarian cancer cells. In a KRAS-induced mouse model of lung cancer, ETP 47187 inhibited tumor growth and downregulated pAkt levels in tumor tissue.

ganglioside inhibitor, Zacharon

Zacharon provides development update

Zacharon is developing small molecule selective inhibitors of ganglioside biosynthesis for the treatment of neural crest-derived tumors and gangliosidoses, a family of liposomal storage disorders that includes Tay-Sachs, Sandhoff, AB variant and GM1 gangliosidosis. At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, the company presented preclinical data from studies of the best analogues of three different scaffolds, ZP 10395, ZP 10295 and ZP 10354. When administered subcutaneously or orally at 30 mg/kg in pharmacokinetic mouse studies, ZP 10395 and ZP 10295 penetrated the blood-brain barrier and reached approximate levels in the blood and CNS required to inhibit ganglioside biosynthesis, as determined by *in vitro* assays. In wild-type C57BL6 mice dosed with ZP 10395, ZP 10295 or ZP 10354 for 40 days, brain ganglioside content as determined by HPLC was significantly affected by ZP 10395 and ZP 10295, but not ZP 10354. In an *in vivo* study that administered ZP 10395 in a mouse xenograft melanoma model, the agent significantly reduced ganglioside production (by approximately 30%) and slowed tumor growth in the presence of a reduced T-cell response. Other glycolipid classes that are associated with dose-limiting toxicities were not inhibited. Research is ongoing to identify a clinical candidate.

MAP4 inhibitors, Chugai

Chugai preclinical data

Chugai is investigating small molecules targeting microtubule-associated protein 4 (MAP4), which show potential in the treatment of cancer. At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, the company reported data

from preclinical studies of a compound from the program, CH 4938056. The agent demonstrated antiproliferative activity, induced mitotic arrest and destabilized tubulin activity in HCT116 cells *in vitro*. The agent showed antitumor efficacy in drug-resistant xenograft models. A phosphate prodrug of CH 4938056 demonstrated preferable pharmacokinetics.

PF 4942847

Pfizer preclinical data

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Pfizer reported data from preclinical studies of PF 4942847, a heat shock protein 90 (Hsp90) inhibitor, being developed as a potential therapy for cancer. In triple negative breast cancer (TNBC) cells, PF 4942847 demonstrated antiproliferative activity by inducing degradation of Hsp90 client proteins, including EGFR, AKT, Her2, cMet, B-Raf and c-Raf, as well as inducing Hsp70 increases. PF 4942847 was well tolerated in mice. A dose-dependent tumor growth inhibition was observed in MDA-MB-231 and MX-1 xenografts (TNBC models).

PF 5177624

Pfizer preclinical data

At the American Association of Cancer Research 102nd Annual Meeting, 2-6 April 2011, Orlando, USA, Pfizer reported preclinical data for PF 5177624, a 3-phosphoinositide-dependent kinase-1 (PDK1) inhibitor with potential for the treatment of breast cancer. Results showed that PF 5177624 inhibited cell proliferation induced by insulin-like growth factor 1 (IGF-1) in MCF-7 and T47-D breast cancer cell lines. This effect was shown to be linked to the blockade of IGF-1-stimulated PDK1 activity; the agent blocked IGF-1-induced phosphorylation of AKT at T308, and IGF-1-induced downstream signaling, shown by modulation of phosphorylation of p70S6K and S6RP. PF 5177624 also blocked cell transformation. Preclinical evaluation is ongoing.

BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy

News from GlycoVaxyn

vaccine, meningitis B, GlycoVaxyn

GlycoVaxyn conducting discovery program, Switzerland (meningitis)

GlycoVaxyn is conducting a program to develop a vaccine for the prevention of meningitis B, Veronica Gambillara, the company's Director of Business Development, informed R&D Focus at BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy. The program is utilizing GlycoVaxyn's technology to synthesize complex immunogenic bioconjugates via a biological process in *Escherichia coli*. Discovery stage research is under way.

vaccine, *Pseudomonas aeruginosa*, GlycoVaxyn

GlycoVaxyn conducting discovery program, Switzerland (bacterial infection)

GlycoVaxyn is conducting a program to develop a vaccine for the prevention of nosocomial *Pseudomonas aeruginosa* infections. The program is utilizing GlycoVaxyn's technology to synthesize complex immunogenic bioconjugates via a biological process in *Escherichia coli*. Discovery stage research is under way, Veronica Gambillara, Director of Business Development at GlycoVaxyn, informed R&D Focus at BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy.

vaccine, *Shigella*, GlycoVaxyn

GlycoVaxyn partnering opportunity, Worldwide

GlycoVaxyn is conducting a program to develop a bioconjugate vaccine for the prevention of *Shigella*

infections, using GlycoVaxyn's technology to synthesize complex immunogenic bioconjugates via a biological process in *Escherichia coli*. The four main *Shigella* serotypes have been produced; the first serotype is called GVXN SD133 (*Shigella dysenteriae*). A phase I trial of a vaccine consisting of a polysaccharide of *Shigella dysenteriae* O1 conjugated to a protein carrier has been conducted. At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Veronica Gambillara, the company's Director of Business Development informed R&D Focus that this program is available for partnering, worldwide.

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vaccine, *Staphylococcus aureus*, GlycoVaxyn

GlycoVaxyn provides progress update

GlycoVaxyn is developing a bioconjugate vaccine for the prevention of *Staphylococcus aureus* infections, Veronica Gambillara, the company's Director of Business Development, informed R&D Focus at BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy. The bioconjugate *S. aureus* vaccine was developed using GlycoVaxyn's proprietary technology, by conjugating in vivo staphylococcal surface polysaccharides to conserved protein antigens from *S. aureus*. Preclinical studies are ongoing; phase I evaluation is expected to start in 2012.

vaccine, *Streptococcus pneumoniae*, GlycoVaxyn

GlycoVaxyn conducting discovery program, Switzerland (pneumonia)

At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Veronica Gambillara, Director of Business Development at GlycoVaxyn, informed R&D Focus that the company is conducting a program to develop a vaccine for the prevention of *Streptococcus pneumoniae* infection. The program is utilizing GlycoVaxyn's technology to synthesize complex immunogenic bioconjugates via a biological process in *Escherichia coli*. Discovery stage research is under way.

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Updates from Isu Abxis

MAB, cancer, Isu Abxis

Isu Abxis conducting discovery program

Isu Abxis is conducting a program to develop monoclonal antibodies for the treatment of cancer. Discovery stage research is under way in South Korea. R&D Focus was updated on this program by June-Young Park, Director of Business Development at Isu Abxis, and Jung Woong Choi, Manager of Business Development, at BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy.

ISU 103

Isu Abxis partnering opportunity, Worldwide

Isu Abxis is developing ISU 103 (trastuzumab), a humanized monoclonal antibody targeted against the HER2 protein, for the treatment of breast cancer. The antibody is being developed as a biosimilar version of HERCEPTIN. Preclinical studies are ongoing in South Korea, and the company expects to file an IND in fourth quarter 2011. ISU 103 is available for partnering, worldwide, June-Young Park, Director of Business Development at Isu Abxis, and Jung Woong Choi, Manager of Business Development, told R&D Focus at BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy.

ISU 201

Isu Abxis partnering opportunity, Worldwide

Isu Abxis is developing ISU 201, a recombinant fusion protein targeting bone marrow stromal cell antigen 2 (BST2) for the treatment of asthma. The agent also has potential in autoimmune diseases and sepsis. ISU 201 is at the preclinical stage of development; an IND was filed with the US FDA in September 2010. At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, June-Young Park, Director of Business Development at Isu Abxis, and Jung Woong Choi, Manager of Business Development, informed R&D Focus that ISU 201 is available for partnering, worldwide.

For further information on the opportunities available, contact:

June-Young Park
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ISU 302

Isu Abxis partnering opportunity, Worldwide

At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, June-Young Park, Director of Business Development at Isu Abxis, and Jung Woong Choi, Manager of Business Development, informed R&D Focus that ISU 302 is available for partnering, worldwide. ISU 302 is imiglucerase, an injectable recombinant version of a modified form of glucocerebrosidase. The agent is being developed as a biosimilar version of CEREZYME, for the treatment of Gaucher's disease. Phase III evaluation is under way in Egypt and South Korea.

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ISU 303

Isu Abxis partnering opportunity, Worldwide

At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, June-Young Park, Director of Business Development at Isu Abxis, and Jung Woong Choi, Manager of Business Development, informed R&D Focus that ISU 303 is available for partnering, worldwide. ISU 303 is agalsidase beta, a

recombinant form of alpha galactosidase A. The agent is being developed as a biosimilar version of FABRAZYME. Preclinical studies are ongoing in South Korea.

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Opportunities with Limerick BioPharma

LIM 0705

Limerick BioPharma partnering opportunity, Worldwide

Limerick BioPharma is developing LIM 0705, an oral agent that amplifies insulin sensitivity and reduces aberrant lipid accumulation in organs that regulate glucose metabolism. The agent has potential in the treatment of diabetes, dyslipidemia, non-alcoholic steatohepatitis (NASH) and metabolic dysfunction induced by immunosuppressants in solid organ transplantation. A phase Ib trial of the agent has completed and a phase II trial in insulin-resistant patients is expected to start in second quarter 2011. At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Jill Carroll, Vice President of Strategic Corporate Development at Limerick BioPharma informed R&D Focus that LIM 0705 is available for partnering, worldwide.

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LIM 0723

Limerick BioPharma partnering opportunity, Worldwide

Limerick BioPharma is developing LIM 0723, a small molecule that amplifies insulin sensitivity and reduces aberrant lipid accumulation in organs that regulate glucose metabolism, for the treatment of metabolic diseases. Preclinical studies are ongoing. At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Jill Carroll, Vice President of Strategic Corporate Development at Limerick BioPharma, informed R&D Focus that LIM 0723 is available for partnering, worldwide.

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Opportunities with M's Science cutamesine

M's Science partnering opportunity, Worldwide

M's Science is developing cutamesine (SA 4503), an oral sigma-1 receptor agonist, for potential use in recovery from stroke, and as a treatment for major depression and orphan neurodegenerative conditions. Phase II trials of cutamesine for the treatment of stroke and major depression have completed in Europe. M's Science owns the development rights for cutamesine and all underlying utility and composition intellectual property. At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Roman Urfer, CSO & Senior VP of International Development at M's Science, informed R&D Focus that the company is open to partnering discussions for cutamesine.

For further information on the opportunities available, contact:

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MC 116

M's Science partnering opportunity, Worldwide

At BIO-Europe Spring 2011, 14-16 March 2011, Milan, Italy, Roman Urfer, CSO & Senior VP of International Development at M's Science, informed R&D Focus that MC 116 is available for partnering, worldwide. The agent,

an oral, CNS-active sigma-1 receptor agonist, is being developed for the treatment of CNS disorders such as Alzheimer's disease, Parkinson's disease and cognitive impairment in schizophrenia. IND-enabling preclinical studies are ongoing; an IND filing is expected in 2012.

For further information on the opportunities available, contact:

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BioTrinity 2011, 12-14 April 2011, Newbury, UK

News from Scancell

ImmunoBody

Scancell partnering opportunity, Worldwide

Scancell is developing ImmunoBody, a proprietary technology that uses an engineered humanized monoclonal antibody (SC 100) as a vector to both target and activate cytotoxic T-lymphocytes (CTL). Scancell licensed the human monoclonal anti-idiotypic antibody 105AD7 from Cancer Research Technology in August 2010 to integrate into and enhance the platform. ImmunoBody constructs, which consist of antibodies or fusion proteins engineered to express CTL epitopes, have potential in the treatment of cancer and infectious diseases. The constructs can be altered for a specific tumor type or virus. They are taken up by dendritic cells, leading to the upregulation of co-

stimulatory molecules and processing and presentation of the antigen on both class I and class II MHC molecules. Scancell has validated ImmunoBody using a range of DNA delivery methods. Scancell's ImmunoBodies include SCIB 1 and SCIB 2, and in June 2010, the company established a collaboration with immatics to develop vaccines for colorectal cancer using ImmunoBody constructs.

At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Richard Goodfellow, Chief Operating Officer at Scancell, informed R&D Focus that the ImmunoBody technology is available for licensing or partnering, worldwide.

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SCIB 1

Scancell provides development update

Scancell is developing SCIB 1, a DNA vaccine for the treatment of melanoma in HLA-A2 patients. The vaccine, which was developed using Scancell's ImmunoBody technology, is a plasmid DNA which encodes a human antibody molecule engineered to express the TRP2 and gp100 melanoma antigens. SCIB 1 utilizes Ichor Medical Systems' TriGrid electroporation delivery device, thereby enhancing the potency of the vaccine. In June 2010 Scancell initiated dosing in a phase I/IIa trial of SCIB 1 in the UK in patients with late-stage melanoma. At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Richard Goodfellow, Chief Operating Officer at Scancell, informed R&D Focus that initiation of the phase IIa portion of the trial is expected to occur during second half 2011.

SCIB 2

Scancell provides update on development

Richard Goodfellow, Chief Operating Officer at Scancell, informed R&D Focus at BioTrinity 2011, 12-14 April 2011, Newbury, UK, that lead candidates have been identified in the company's SCIB 2 program. Scancell is developing SCIB 2, an antiangiogenic DNA vaccine developed using the company's ImmunoBody technology, for the treatment of angiogenic tumors, either as a monotherapy or in combination with tumor-specific vaccines. The vaccine utilizes Ichor Medical Systems' TriGrid electroporation delivery device, thereby enhancing the potency of the vaccine. Scancell expects to seek out-licensing opportunities for SCIB 2 upon completion of preclinical development.

vaccine, colorectal cancer, Scancell/immatics

Scancell preclinical evaluation, UK (colorectal cancer)

Scancell and immatics are conducting a program to develop DNA vaccines for colorectal cancer. The vaccines comprise immatics' colorectal cancer-specific tumor-associated peptides (TUMAPs) incorporated into Scancell's dendritic cell targeting ImmunoBody constructs. At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Richard Goodfellow, Chief Operating Officer at Scancell, informed R&D Focus that the companies have identified a DNA vaccine candidate, and that preclinical animal studies initiated earlier this year.

Opportunities with NovaBiotics

antibacterial peptides, NovaBiotics

NovaBiotics partnering opportunity, Worldwide

NovaBiotics is developing a series of antibacterial peptides for the systemic treatment of bacterial infections. The

physicochemical nature of the compounds is such that they could be administered in aerosol form, indicating their potential for use by cystic fibrosis patients. NP 432 has been selected from this program. At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, informed R&D Focus that this program is available for worldwide partnering. Lead optimization is being conducted.

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antifungal peptides, NovaBiotics

NovaBiotics partnering opportunity, Worldwide

NovaBiotics is developing a series of small cationic peptides for the treatment of systemic fungal infections. These peptides show potent fungicidal activity and the agent NOVAMYCIN originated from this program. Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, informed R&D Focus at BioTrinity 2011, 12-14 April 2011, Newbury, UK, that this program is available for worldwide partnering. Preclinical studies are ongoing.

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NM 001

NovaBiotics partnering opportunity, Worldwide

At BioTrinity 2011, 12-14 April 2011, Newbury, UK, R&D Focus was informed by Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, that NM 001 is available for worldwide licensing or partnering. NM 001, a mucolytic agent, is being developed by NovaBiotics for the treatment of mycosis. The agent has previously been approved for undisclosed therapeutic uses, unrelated to mucolytic or antimicrobial applications. Early proof-of-efficacy preclinical studies are ongoing. NovaBiotics expects to receive Orphan Drug designation for NM 001 in the USA and EU in September 2011. The company also plans to initiate a phase I/IIa trial in cystic fibrosis patients in 2012.

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NP 213

NovaBiotics partnering opportunity, Worldwide

NovaBiotics is developing NP 213 (NOVEXATIN), a cationic, membrane lytic peptide, for the topical treatment of onychomycosis. At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, informed R&D Focus that NP 213 is available for worldwide licensing or partnering. A phase IIa trial has completed in Germany. The company expects to hold a pre-IND meeting regarding NP 213 in June 2011, followed by an IND and CTA filing for approval of a phase IIb trial during second half 2011.

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NP 339

NovaBiotics partnering opportunity, Worldwide

At BioTrinity 2011, 12-14 April 2011, Newbury, UK, Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, informed R&D Focus that NP 339 (NOVAMYCIN) is available for licensing or partnering, worldwide. NovaBiotics is developing NP 339, a membrane lytic peptide, for the treatment of Candida infections such as candidemia and candidiasis. The agent is a lead compound from a series of antifungal peptides identified by NovaBiotics and is structurally related to

NP 213 (NOVEXATIN). NP 339 will be formulated for both oral and intravenous delivery. Preclinical studies are being conducted. A phase I/IIa trial evaluating NP 339 in the treatment of oropharyngeal indications is expected to start in 2012.

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NP 432

NovaBiotics partnering opportunity, Worldwide

NovaBiotics is developing NP 432, a broad-spectrum antibacterial peptide involved in membrane lysis, for the treatment of respiratory infections including multidrug resistant forms and those associated with cystic fibrosis. The agent can be aerosolized to facilitate delivery directly to the target sites within the lung or can be administered intravenously for the treatment of serious infections. NovaBiotics expects to receive Orphan Drug Designation for NP 432 in the USA and EU for the treatment of bacterial infections during second half 2011. Andy Porter, Director of NovaBiotics, and Deborah O'Neil, Chief Executive & Scientific Officer, informed R&D Focus at BioTrinity 2011, 12-14 April 2011, Newbury, UK, that NP 432 is available for partnering worldwide. Early proof-of-efficacy preclinical studies are ongoing.

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Company Focus

Focus on Ventrus

Ventrus was founded in 2005 and is based in New York (USA). The company focuses on the late-stage clinical development of therapies for gastrointestinal disorders, specifically hemorrhoids, anal fissures, and fecal incontinence. Ventrus has acquired the North American rights to its fecal incontinence and chronic anal fissure programs from SLA Pharma. The company has acquired the worldwide rights to its program for the treatment of hemorrhoids.

VEN 308

Ventrus plans US phase IIb trial

Ventrus plans to initiate a dose-ranging phase IIb trial of VEN 308 in the USA during 2012. VEN 308 is a gel formulation of the alpha adrenergic agonist phenylephrine, being developed for the treatment of fecal incontinence associated with ileal pouch anal anastomosis (IPAA). VEN 308 increases anal sphincter tone therefore is targeted for use in patients where sphincter tone is a major cause of symptoms such as post-IPAA surgery. Phase II evaluation is being conducted. In August 2007, Ventrus acquired North American rights to the agent from SLA Pharma.

VEN 307

Ventrus developing calcium channel blocker for chronic anal fissure

Ventrus plans to initiate phase III trials of an extended-release topical formulation of diltiazem (VEN 307), a calcium channel blocker, for the treatment of chronic anal fissure in the USA. Ventrus acquired North American rights to the agent from SLA Pharma in August 2007. SLA Pharma is conducting a phase III trial in Europe evaluating topical diltiazem in patients with anal fissure. Completion of enrolment is expected in December 2011/January 2012 with data release anticipated during second quarter 2012.

VEN 309

Ventrus plans to initiate pivotal phase III trial

Ventrus is developing a topical formulation of iferanserin (VEN 309), a 5-HT_{2A} antagonist, for the treatment of hemorrhoids. The agent improves the flow of blood out of the dilated veins that comprise the hemorrhoid thereby reducing bleeding, itchiness and pain. Ventrus is planning to initiate the first of two pivotal phase III trials in North America evaluating topical iferanserin for the treatment of hemorrhoids mid 2011. In March 2008, Ventrus acquired worldwide rights to the agent from Sam Amer. Sam Amer has conducted a phase IIB/III trial in Europe.

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Newly Reported Drugs in R&D Focus

Company	Product	Therapeutic Class*	Indication	Phase
Adami's	TeloB-VAX	J7C; L3A9	prostate cancer	Phase I
Advaxis	vaccine, fibroblast activation protein, Advaxis	J7C; L3A9	solid tumor	Discovery
AstraZeneca	AZD 5363	L1X9	solid tumor	Phase I
Beech Tree Labs	UIISH 001	G4D	urinary incontinence	Phase I/II
Biogen Idec	recombinant factor IX, Amunix/Biogen Idec	B2D9	hemophilia	Discovery
Biogen Idec	recombinant factor VIIa, Amunix/Biogen Idec	B2D9	hemophilia	Discovery
Biogen Idec	recombinant factor VIII, Amunix/Biogen Idec	B2D1	hemophilia	Discovery
Chugai	AF 802	L1X4	NSCLC	Phase I/II
Chugai	MAP4 inhibitors, Chugai	L1X9	cancer	Discovery
Cytotech Labs	API 31510	L1X9	basal cell carcinoma; leukemia; pancreatic cancer; squamous cell carcinoma	Phase II
Debiopharm	Debio 1142	L1X9	cancer	Discovery
Genmab	HuMax CD74	L1X9	cancer	Preclinical
GlycoVaxyn	vaccine, meningitis B, GlycoVaxyn	J7A8	meningitis	Discovery
GlycoVaxyn	vaccine, Pseudomonas aeruginosa, GlycoVaxyn	J7A9	bacterial infection	Discovery
GlycoVaxyn	vaccine, Streptococcus pneumoniae, GlycoVaxyn	J7A7	pneumonia	Discovery
Isofol Medical	MODUFOLIN	V3D	cancer therapy toxicity; colorectal cancer	Phase I/II
Isu Abxis	ISU 103	L1X3	breast cancer	Preclinical
Isu Abxis	ISU 302	A16A	Gaucher's disease	Phase III
Isu Abxis	ISU 303	V3X	Fabry disease	Preclinical
Isu Abxis	MAB, cancer, Isu Abxis	L1X3	cancer	Discovery
Johns Hopkins University	delivery system, 4-phenylbutyrate-containing nanospheres, Johns Hopkins University	V7A	Delivery System	Technology
Johns Hopkins University	delivery system, aerosolized polyether-anhydride polymers, Johns Hopkins University	V7A	Delivery System	Technology
Johns Hopkins University	delivery system, gelatin/chondroitin sulfate, Johns Hopkins University	V7A	Delivery System	Technology
MEDRx	drug delivery system, topical etodolac, MEDRx	N2B; V7A	pain	Phase III
Molecular Templates	lymphoma therapy, Engineered Toxin Bodies, Molecular Templates/Memorial Sloan-Kettering Cancer Centre	L1X9	lymphoma	Discovery

See R&D Focus (Drug Updates) for full product details
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Newly Reported Drugs in R&D Focus

Company	Product	Therapeutic Class*	Indication	Phase
National Cheng Kung University	llama antibodies, National Cheng Kung University/ National Research Council of Canada	L1X3	cancer	Discovery
NeuroVive	CicloMulsion	C1D; V7A	reperfusion injury	Phase III
Pfizer	CVX 19	L1X9	cancer	Preclinical
Pfizer	PF 4942847	L1X9	cancer	Preclinical
Pfizer	PF 5177624	L1X4	breast cancer	Preclinical
RadioRx	ABDNAZ	L1X9	cancer	Preclinical
Regeneron	REGN 910	L1X3	solid tumor	Phase I
Regulus	miRNA-targeted anti-angiogenesis therapies, Regulus/ University of California at San Diego	V3X	all other therapeutics	Discovery
Rhizen	RP 4009	L1X9	NSCLC	Preclinical
Rottapharm	CR 4056	N2B; N7X	neuropathic pain; pain	Preclinical
Scripps Research Institute	SR 1001	N7X	multiple sclerosis	Preclinical
Sigma-Tau	adarotene prodrug, Sigma-Tau	L1X9	cancer	Preclinical
Synta	STA 1474	L1X9	cancer	Preclinical
Trius	multidrug-resistant bacterial infection therapy, Trius/ LLNL	J1X9	bacterial infection	Discovery
University of California at Davis	anticancer agents, University of California at Davis	L1X9	cancer	Discovery
University of South Carolina	PLK1 inhibitors, University of South Carolina	L1X4	cancer	Discovery
Ventrus	VEN 307	D3A9; V7A	wound	Phase III
Ventrus	VEN 308	V3X; V7A	all other therapeutics	Phase II
Ventrus	VEN 309	C5A; V7A	hemorrhoids	Phase II/III
Zacharon	ganglioside inhibitor, Zacharon	A16A; L1X9	CNS tumor; lysosomal storage disorder	Discovery

Product Phase Changes Reported in R&D Focus							
Company	Product	Therapeutic Class*	Indication	NewPhase	Region of Phase Change	Highest Phase	
Amgen	omecamtiv mecarbil	C1D	heart failure	Phase II	Worldwide	Phase II	
Bayer	rivaroxaban	B1X	stroke	Pre-registration	Japan	Marketed	
Beech Tree Labs	UI5H 001	G4D	urinary incontinence	Phase I/II	USA	Phase I/II	
Biogen Idec	rituximab	L4X	autoimmune disease	Registered	USA	Marketed	
Corcept	mifepristone	V3X	Cushing's disease	Pre-registration	USA	Marketed	
Critical Outcome Technologies	COTI 2	L1X4	solid tumor	Preclinical	Canada	Preclinical	
Durata	dalbavancin	J1X1	bacterial infection	Phase III	Worldwide	Phase III	
Eisai	eslicarbazepine acetate	N3A	epilepsy	Marketed	Greece	Marketed	
GW Pharmaceuticals	nabiximols	M3B; N2B; N7X	muscle spasm	Registered	Czech Republic	Marketed	
Human Genome Sciences	belimumab	L4X	systemic lupus erythematosus	Marketed	USA	Marketed	
Isofol Medical	MODUFOLIN	V3D	cancer therapy toxicity; colorectal cancer	Phase I/II	Sweden	Phase I/II	
Japan Tobacco	ferric citrate	V3G	hyperphosphatemia	Phase III	Japan	Phase III	
Lilly	pomaglumetad methionil	N5A1	schizophrenia	Phase III	Croatia; Puerto Rico; Romania; Russia; USA	Phase III	
NeuroVive	CicloMulsion	C1D; V7A	reperfusion injury	Phase III	Europe	Phase III	
Paladin	levonorgestrel + ethinylestradiol	G3A	contraception	Marketed	Canada	Marketed	
Proteon	PRT 201	C6A	surgery	Phase II	USA	Phase II	
Roche	TB 403	L1X3	hepatocellular carcinoma	Phase I	Europe	Clinicals	
Roche	tocilizumab	M1C	arthritis	Registered	USA	Marketed	
Scancell	vaccine, colorectal cancer, Scancell/immatics	J7C; L3A9	colorectal cancer	Preclinical	UK	Preclinical	
Ventrus	VEN 307	D3A9; V7A	wound	Phase III	Europe	Phase III	
Takeda	azilsartan medoxomil	C9C	hypertension	Marketed	USA	Marketed	

* A change in phase may not apply to all therapeutic classes and indications