



# Parkinson's Disease Marketing Opportunity Assessment

January 2009

## SAMPLE REPORT

NOTE: This report is for illustration only to provide examples of information that can be provided in Telescope reports. The materials included in this report do not pertain to any actual company. Any resemblance to any actual company is coincidental. Certain data and elements of this report have been redacted.

## Notes

- Telescope reports are a customized compilation Business Insights report findings, and findings from numerous other industry sources and databases to support strategic planning and decision support for life science companies.
- Actual Telescope reports will include all Business Insight report sections used to create the final report.
- This is an example of a Telescope final report tailored to provide top-level overview of Parkinson's Disease for a small pharma client.

## Key References Used in this Report

- **CNS Market Outlook to 2013** -New report published by Business Insights that provides comprehensive coverage of the major markets within the global CNS disorders market, incorporating a detailed epidemiological analysis of major indications and key factors impacting their prevalence. This report profiles the factors and underlying trends shaping the market landscape and identifies the most promising areas of potential growth.
- **The Future of Targeted Therapeutics: Key technologies, new therapy area applications and leading players** - New report published by Business Insights that examines various types of targeted therapy within pharma pipelines, highlighting the molecules of greatest significance to major therapy areas. The key revenue drivers and product focus within targeted technology markets are also assessed.

## **Background**

Company X has a gene transfer technology platform and has gene therapy compound in Phase II for a non-CNS indication. Recently, Company X has demonstrated that AAV gene vectors can be safely transferred to targeted cells in the brain. With the ability to safely transfer gene vectors across the blood brain barrier and into targeted cells, Company X is seeking to develop a gene therapy drug for a neurodegenerative disease and is exploring development opportunities in conditions such as Parkinson's Disease(PD), Alzheimer's, ALS, and Huntington's Disease. Based on pre-clinical studies, Parkinson's disease appears to have the highest probability of technical success.

Company management does not have experience working with PD products and would like a commercial evaluation to support the decision to pursue Parkinson's disease and gain a better understanding of the market opportunity and clinical development criteria that will be required for commercial success.

This project will provide a top level market opportunity assessment of Parkinson's disease to gain a better understanding of:

- Market size and landscape
- Level of unmet need
- Competitive landscape
- PD Pipeline product development
- Comparable PD licensing deals

The outcome of this project will support stage gate decision making and help frame future advisory board, market research, and financial analysis activities to formalize the clinical development and commercial strategy for Company X's lead PD gene therapy drug candidate.

## **Report Sections**

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## **Disease Description**

Parkinson's disease is a neuro-degenerative disease which affects around 4m people globally, which is estimated to be twice as prevalent in men as in women. It is a disease affecting the elderly that progressively impairs movement and the average age at which symptoms begin to develop is 55–60 years.

The major symptoms of the disease are:

- suppressed voluntary movements (bradykinesia);
- rigidity and tremors in limbs, jaw and face;
- impaired balance and coordination;
- impaired memory;
- dementia;
- depression.

PD is a motor system disorder caused by a loss of dopamine-producing cells. Diagnosis of the disease involves studying the patient's medical history and carrying out a neurological examination. There is no treatment for the disease itself but some medications provide relief from the symptoms, with a combination of levodopa and carbidopa the usual prescription. The most common drugs used in the treatment of PD are dopaminergics, dopamine agonists, monoamine oxidize inhibitors (MAOIs), catechol-O-methyltransferase inhibitors (COMT inhibitors), and therapies that are typically used as adjuncts, such as amantadine and anticholinergics.

Although PD is not a fatal condition, the effects of the disease can have a profound impact on the quality of life of a patient. Those who suffer from PD may also be more susceptible to other disease states, both neurological and otherwise.

## Epidemiology

**PREVALENCE:**

- Over 1 million people in North America.
- In age group <40 yr, <5/100,000 are affected. In those >70 yr, 700/100,000 are affected.
- Highest incidence in whites; lowest incidence in Asians and black Africans.

Source: Ferri's Clinical Advisor 2009, 1<sup>st</sup> ed.

PD rarely affects people below the age of 50 years and the risk of developing the disease increases with age. In some cases, however, individuals are affected below the age of 40 years, which is known as young-onset PD. In extremely rare cases the disease may be diagnosed even before the age of 18 years and in such instances it is known as juvenile PD.

PD is one of the most common neurodegenerative diseases, next in frequency to AD alone. The European Parkinson's Disease Association (EPDA) places the prevalence of the disease at 6.3m people worldwide, and it is estimated that there are over 1.4m people affected across the US, Japan and the five major EU markets.

***Estimated prevalence of Parkinson's disease across the seven major markets, 2007***

Country	Prevalence (000s)	Prevalence (%)	Share (%)
France	140	0.23	9.70
Germany			
Italy			
Spain			
UK			
EU5			
US			
Japan			
Total			

**Data available in actual report**

Source: Business Insights analysis

**Estimated Incidence of Parkinson's disease across the seven major markets, 2007**

Country	2007	2008	2009	2010	2011	2012	2013
France							
Incidence (000s)	140	144	148	153	157	162	166
Incidence (%)	0.23	0.23	0.24	0.24	0.25	0.25	0.26
Germany							
Incidence (000s)							
Incidence (%)							
Italy							
Incidence (000s)							
Incidence (%)							
Spain							
Incidence (000s)							
Incidence (%)							
UK							
Incidence (000s)							
Incidence (%)							
EU5							
Incidence (000s)							
Incidence (%)							
US							
Incidence (000s)							
Incidence (%)							
Japan							
Incidence (000s)							
Incidence (%)							
Total							
Incidence (000s)							
Incidence (%)							

**Data available in actual report**

Source: Business Insights analysis

The prevalence of PD is directly correlated with age, and therefore prevalence is anticipated to rise more quickly in those countries that have rapidly ageing populations.

## Market Size and Structure

The total global CNS market was valued at \$100.3bn in 2006, having expanded at a rate of 7.3% from previous year sales of \$93.4bn. 80% of this revenue was representative of sales for treatments of the major CNS disease indications as seen in the table below. Growth in this market has been driven by therapies for Alzheimer's disease, at a rate of 15.4% sales increase for 2005-06. Recorded diagnoses of this disorder have also been on the on the incline globally as a result of both aging populations and increasing physician acknowledgement.

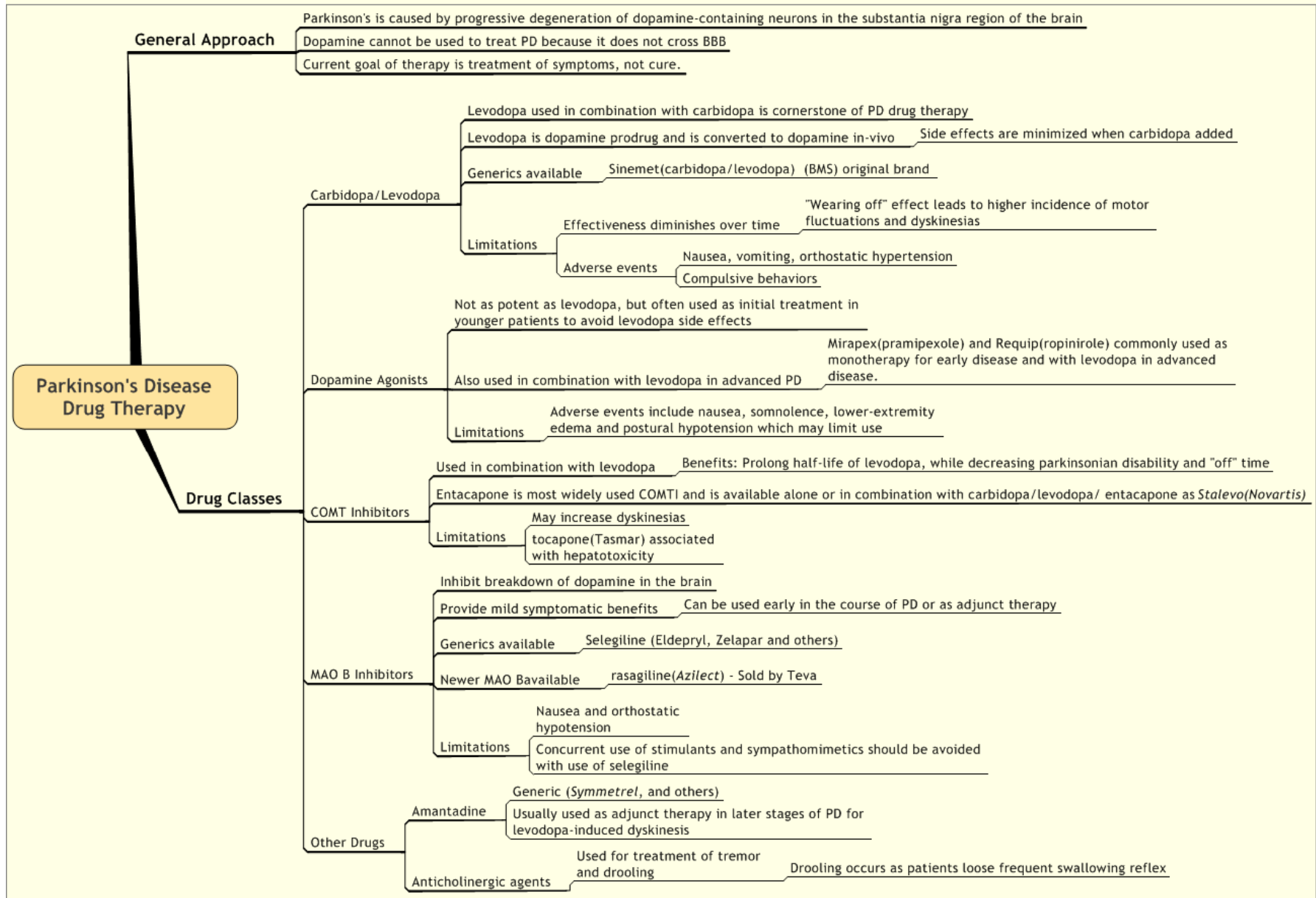
**Global sales of CNS products by disease indication, 2005-2007, \$m**

	Sales	Sales	Sales	Market Share
	2006	2007	Growth (%)	2007 (%)
Schizophrenia				
MDD				
Epilepsy				
AD	<b>Data available in actual report</b>			
Insomnia				
PD				
Migraine				
ADHD				
Total				

Source: Business Insights, IMS Health

The global anti-parkinson's market registered a growth rate of 18.9% from 2006-2007 representing sales valued at \$3.7bn in 2007. This growth rate is robust when compared to its average growth rate of 11.8% observed for the period 2005–2006. The most common drugs used in the treatment of PD comprise of dopamine agonists, catechol O–methyl transferase inhibitors (COMT inhibitors), monoamine oxidase inhibitors (MAOIs) and dopaminergics.

# Quick Overview of Parkinson's Disease Current Treatment Practices



References: Treatment Guidelines, Vol. 5 (Issue 62), Oct. 2007; Ferri: Ferri's Clinical Advisor 2009, 1<sup>st</sup> ed.

## Current Market Landscape and Dynamics

### Leading brands in the anti-parkinson's market

*Table 3.39: Leading anti-parkinson drugs in the global CNS market by drug class, \$m, 2006–2007*

Brand	Generic	Class	Company	Sales 2006	Sales 2007	Growth 06–07 %	Market Share %
Sifrol/Mirapex	pramipexole	DA	Pfizer/BI				
Requip	ropinirole	DA	GSK				
Stalevo	levodopa/ entacapone	DA/ COMTI	Novartis				
Madopar	levodopa/ benserazide	DP	Roc	<b>Data available in actual report</b>			
Sinemet	levodopa/ carbidopa	DP	BMS				
Comtan	entacapone	COMTI	Novartis	143	154	8	4.1
Cabaser	cabergoline	DA	Pfizer	239	153	-36.1	4.1
Azilect	rasagiline	MAOI	Teva	38	114	196.9	3.1
Neupro	rotigotine	DA	UCB	9	68	639.3	1.8
Permax	pergolide	DA	Eli Lilly	91	63	-31.2	1.7
Total of top 10 drugs							
Others							
Total							

Note: DA – Dopamine agonist, DP – Dopaminergic, COMTI – Catechol o methyl transferase inhibitor, BI – Boehringer Ingelheim, MAOI – Monoamino oxidase inhibitors

Source: Business Insights, IMS Health, Copyright ©, reprinted with permission

The ten leading brands in the PD market contributed 77.4% of sales, equivalent to \$XXbn in 2007. Sifrol, marketed under the name Mirapex was the leading product in the global PD market and accrued sales of \$XXXm, an increase of XX% from 2006. The growth of the PD market was mainly driven by two recently

approved drugs Neupro and Azilect, which registered sales growth of XX% and XX% respectively. Azilect was approved by the FDA in May 2006 as a once-daily oral treatment for PD. The drug is also approved as adjunct therapy to levodopa in moderate-to-advanced PD. Neupro was launched in the US in May 2007 and registered a very high growth rate of XX%; however the drug was withdrawn again in March 2008 due to reduced clinical performance of the Neupro patch that was distributed in US. Hence UCB has recalled its product from the US and the re-entry timelines of Neupro are currently unsure.

### **COMT inhibitors**

Catechol-O-methyl transferase is an enzyme that causes degradation of catecholamines such as dopamine, epinephrine and nor-epinephrine. COMT inhibitors work by blocking these enzymes and prevent the break down of levodopa, thereby elevating the dopamine levels in the body, which helps to alleviate the symptoms of PD. COMT inhibitors are generally prescribed in combination with levodopa in order to enhance the delivery of levodopa into the brain and to increase the efficacy of the drug, thereby lessening the symptoms of PD.

#### *Key brand analysis*

##### *Stalevo*

Stalevo is a combinational drug that consists of entacapone, a COMT inhibitor and the dopaminergic agonists levodopa and carbidopa. Stalevo, manufactured by Orion Corporation and marketed by Novartis Pharmaceuticals Corporation in the US, was approved by the US FDA in June 2003. The drug experienced strong sales growth of XX%, an increase of \$XXm from the sales of \$XXm in 2006 to \$XXm in 2007. Stalevo's key competitive advantage lies in the product's availability in three dosage strengths, which facilitates an ease of switching patients that are currently prescribed with levodopa and carbidopa and require the addition of entacapone, or are prescribed all three compounds in separate treatments. In August 2007, the US FDA approved Stalevo's higher dose strength indicated for PD patients with signs and symptoms of the end-of-dose "wearing off". The approval of this dosage of Stalevo offers the physicians flexibility in designing the treatment regimens for various patients. Additionally, this approved dosage of Stalevo has a clinical advantage that patients can take one pill instead of two separate tablets and this is an advantage especially for patients who have complex medication regimens with high pill counts. Stalevo continues to be patent protected until 2018. Considering its clinical advantages and patent exclusivity until 2018, the drug is expected to generate sales of \$XXm in 2013.

## **Dopamine agonists**

Dopamine agonists are those compounds that activate the dopamine receptors and directly stimulate the receptors present in the nerves of the brain, which would normally be stimulated by dopamine. With six out of the ten leading brands falling under this class, these medications are currently the most represented drug class in the global PD market. Although dopaminergics such as levodopa have dominated the PD market, the high incidence of adverse events with long term use of levodopa and positive results of clinical studies indicating enhanced efficacy of dopamine agonists, particularly in patients that have developed a lack of sensitivity towards increased levels of dopamine in the brain will augment the sales performance of the dopamine agonists.

### *Key brand analysis*

#### *Mirapex/Sifrol*

Mirapex currently holds the leading position in the global PD market and has registered a growth rate of 31.6% in 2006–2007 with sales of \$895m in 2007. Mirapex (pramipexole) was originally developed and launched by Pharmacia in 1997 and was subsequently acquired by Pfizer, following the Pharmacia acquisition deal in 2003. Mirapex is indicated for the treatment of alleviating symptoms of PD and also gained an additional indication in the treatment of Restless Legs Syndrome in the EU and the US in November 2006. Mirapex primarily competes against GSK's Requip, which has a similar mechanism of action as that of Mirapex. Mirapex's recent approval for an additional indication in the treatment of Restless Legs Syndrome in the EU has provided the product an opportunity to drive further growth. Additionally, Boehringer is also conducting phase III clinical trials for testing the efficacy, safety and tolerability profiles of extended and immediate release versions of Mirapex. The clinical trials are anticipated to be completed by December 2008, and the IR and ER versions of the drug are expected to be launched in the US by late 2009 or early 2010. Mirapex is expected to lose its patent exclusivity in 2011. The product also holds marketing exclusivity rights to its indication in the treatment of RLS until 2009. The drug is expected to accrue sales of \$XXm in 2013.

## **Mono-amino oxidase (MAO) inhibitors**

Natural chemicals such as neurotransmitters carry signals from one brain cell to another. Other substances in the brain may interfere with this process and break down the transmitters thereby disrupting the transfer of signals. MAO inhibitors work by blocking the chemicals that cause the breakdown of the neurotransmitters and rectify the chemical imbalance in the brain. The MAO inhibitors are a new class of drugs in the PD market and Azilect is one of the first MAO inhibitors launched for the treatment of PD.

### *Key brand analysis*

#### *Azilect*

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Azilect (rasagiline) was launched in the US by Teva pharmaceuticals in May 2006 as a once daily oral treatment for PD. Azilect accrued sales of \$XXm in 2007, experiencing strong growth of XX% from previous year sales of \$XXm. Azilect is currently approved for treating PD and is prescribed as an initial monotherapy as well as in combination with levodopa.

Teva, the manufacturer of Azilect is currently conducting phase III clinical trials for Azilect to delay the progression of Parkinson's disease. The phase III trial ADAGIO is an 18 month trial and is being carried out on 1,176 patients. Although the full data results are yet to be announced, data from the trial has the potential to change the landscape of Parkinson's treatment by moving Azilect to frontline therapy which would increase market share and boost worldwide sales. However uncertainty exists on the potential adoption of the drug until more data from the trial is released.

Teva is planning on submitting Azilect's clinical trial results to the regulatory agencies in the US and EU. If the top-line data lives up to expectations, then it could be the first marketed drug for Parkinson's with a disease modifying claim, which essentially may qualify it to gain an additional 5 years of exclusivity. This in return may accelerate the growth of Azilect sales in the forecast period and may enable the product to achieve blockbuster status in the best case scenario. However we are limiting the sales forecast to \$XXm by 2013 that reflects the current market scenario.

Overview of recent US sales and market share activity can be made available in actual report

Overview of prescribers, referral patterns, managed care impact, and key drivers/barriers driving product use can be made available as part of *EyeGlass™* and *Microscope™* projects.

### Anti-parkinson’s sales forecast to 2013

Table 3.40: Anti-parkinson drugs sales forecast, \$m, 2007–2013

Brand	Molecule	Sales	Sales	Sales	CAGR	Expected patent expiry
			2007	2010	2013	2007 - 13
Sifrol/Mirapex	pramipexole	895	1,150	900	0.1%	2011
*Requip	ropinirole					
Stalevo	levodopa/ entacapone					
Madopar	levodopa/ benserazide	<b>Data available in actual report</b>				
Sinemet	levodopa/ carbidopa					
Comtan	entacapone					
Azilect	rasagiline					
Total						
Other						
Total anti-parkinson						
Note: * includes line extensions						

Source: Business Insights, IMS Health, Copyright ©, reprinted with permission

Growth in the PD market is forecast to remain slow, with an estimated CAGR of XX% for 2007–2013. Within this time period, most major brands in this market are expected to come off patent, resulting in the onset of heavy generic competition. New product launches in this market are forecast to remain low in number, with only two new launches of Merck – Serono’s safinamide and Acadia Pharmaceuticals’ pimavenserin expected during 2009–2010.

# Pipeline Analysis

## Key trends in R & D

Key trends in the R&D of CNS disorders, 2008

	2007	2010	2013
<b>AD</b>	Launch of transdermal patch version of Exelon and Namenda MR	Development of new disease modifying therapies	Potential launch of disease modifying drugs
<b>ADHD</b>	Launch of Vyvanse, replacement for Adderall XR	Approval of Shires' Intuniv, modified release of Guanfacine	
<b>Epilepsy</b>	Uptake of Pfizer's Lyrica driven by superior dosing profile	Launch of new agents: Eisai's Rufinamide, Schwarz's lacosamide	Development of drugs for severe forms of Epilepsy
<b>Insomnia</b>	Non benzodiazepine hypnotics such as Ambien/CR, Lunesta	Launch of GSK/Actelion's novel drug almorexant	
<b>MDD</b>	SSRI/SNRI continues to be the mainstay treatment	Launch of NK antagonists and $\beta$ 3 adrenoceptor agonist	Launch of triple reuptake inhibitors
<b>Migraine</b>	Combination drugs such as GSK's Treximet	Potential launch of Merck's Telcagepant	Launch of glutamatergic receptor inhibitors and NOS inhibitors
<b>PD</b>	Approval of once a day Requip XL	New dosage strength of existing drugs	Development of oral drugs, gene therapy and cell therapy products
<b>SCHZ</b>	Launch of once daily Seroquel XR	Launch of Asenapine and Iloperidone	Launch of Acadia's Pimvanserin

Source: Multiple analyst reports

*Parkinson's pipeline by indication and stage of development, Q1 2009*

Indication	PC	P I	P I / II	PII	P III	NDA	Total
PD	15	10	1	16	13	7	62

Note: PC – Pre-clinical, PI – Phase I, PII – Phase II, PIII – Phase III, NDA – Awaiting approval

Source: *Pharmalive ekb 01/21/09*

**Overview of pipeline products in development can be made available in actual report.**

**Target Product Profile development and evaluation can be made available as part of *EyeGlass* and *Microscope* projects.**

### **Key events in the CNS disorder market**

#### *Spheramine fails to demonstrate efficacy in Phase IIb Parkinson's disease study*

In July 2008, Titan Pharmaceuticals and its partner Bayer Schering AG announced negative results from a 71-patient Phase IIb study of Spheramine, Titan's program for advanced PD. While this result is likely to spell the end of the clinical development of Spheramine, the program was the riskiest in Titan's mid-to late-stage clinical pipeline and therefore had a relatively low probability of success. Parkinson's patients with advanced disease are a heterogeneous group and therefore achieving a statistically significant signal in these trials is considered a high hurdle.

#### *GLP-1 may treat Parkinson's disease*

A group of researchers at the London School of Pharmacy have tested a GLP-1 like molecule (exendin-4) in two rodent models of PD and found remarkably good results. GLP-1 has previously been shown to have neuro-protective properties. Thus, it is not inconceivable that Eli Lilly/Amylin's Byetta and NovoNordisk's liraglutide could treat PD. Dr Alexander Harkavyi et al have published their findings in the latest edition of the Journal of Neuroinflammation. In two rodent models of PD (conceived as more predictive of effects in humans compared with other models of CNS disease), they can show that exendin-4 arrests the progression of, or even reverses, so-called nigral lesions once established. This leads them to conclude "that pharmacological manipulation of the GLP-1 receptor system could have substantial therapeutic utility in PD. It has already been demonstrated in several animal studies that GLP-1 has protective effects on the beta-cells. As GLP-1 crosses the blood brain barrier (as opposed to several other peptides and proteins tested in PD) and GLP-1 receptors are found in the brain, GLP-1 may play a role in this CNS disease.

## Key Trends and Opportunities

### Diagnosis-specific unmet needs

#### *Parkinson's disease and movement disorders*

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- While the motor effects of the disorder and its treatment are being addressed, the neuropsychiatric, sleep and cognitive consequences of PD are only now being addressed.
- Side effect profiles are highly unfavorable, although newer treatments are targeting this aspect of patient need;
- Current treatments only address symptomology and reduce the speed of disease and neuron-progression;

Reformulations of existing treatments are under development including nasal sprays, transdermal patches and subcutaneous depots, all of which deal with particular issues relating to the first liver pass. It is hoped patient differences in tolerability and efficacy will be improved with such direct systemic delivery.

### **General CNS Unmet needs and innovation**

For all CNS indications there are relatively high levels of unmet need. From an R&D and clinical perspective there exist high levels of disease complexity in patient presentation and a subsequent lack of understanding surrounding both the neural mechanisms underlying such disease progression, and the appropriate management of symptoms. This provides high levels of opportunity in the market for new therapies targeting patient subsets with specific defining criteria.

### **Crossing the blood-brain barrier**

The movement of intravascular compounds from the blood to the brain parenchyma is impeded by the blood-brain barrier (BBB), which is made up of endothelial cells, pericytes, the end-feet of astrocytes, and interendothelial tight junctions. The blood-brain barrier effectively excludes molecules of molecular weight exceeding 500 Daltons, limiting the effective chemical compounds to lipid-soluble small molecules. In addition, those molecules that actually penetrate the BBB are subject to extraction from the brain back into the systemic circulation by drug transporters.

**Improving specificity and affinity**

All compounds must show an adequate ADME and safety profile before they are tested in a clinical setting. For CNS disorders, animal models of the specific diseases must continue to strive for a greater level of translatability than has been the case up to now. This would allow for a more reliable assessment of the preclinical (animal model) data to select the targeted molecules for which development may be continued to the clinical stage.

Examination of the current medicinal chemistry requirements for a successful CNS compound listed in the following table indicate how many additional factors need to be taken into account during the complex process of CNS drug discovery and development. Fundamental physiochemical features of CNS drugs are related to their ability to penetrate the blood-brain barrier affinity and exhibit CNS activity. CNS drugs show values of molecular weight, lipophilicity, and hydrogen bond donor and acceptor that in general have a smaller range than general therapeutics. Pharmacokinetic properties can be manipulated by the medicinal chemist to a significant extent. The solubility, permeability, metabolic stability, protein binding, and gene inhibition of CNS compounds need to be optimized simultaneously with potency, selectivity, and other biological parameters.

**Medicinal chemical properties of a successful CNS drug**

Factor	Criteria
Potency	low to sub-nanomolar
Selectivity	at least 10-fold separation from other receptors, etc.
Molecular weight	< 450
Minimal hydrophobic properties	$c \log p < 5$
Number of H-bond donor	< 3
Number of H-bond acceptor	< 7
Number of rotatable bonds	< 8
H-bonds	< 8
pKa	neutral or basic with pKa 7.5–10.5 (avoid acids)
Polar surface area	< 60–70 Å <sup>2</sup>
hERG IC50/ effective unbound plasma concentration	>30-fold margin
Metabolic stability	>80% remaining after 1h.
P450 enzyme CYP inhibition	< 50% at 30µm.
CYP2D6 metabolism	not significant
CYP3A4 inducer	not potent
In vivo P-glycoprotein substrate	not an efficient substrate
Not a high-affinity serum albumin ligand	$K_d < 10^{-6}$ m
Aqueous solubility	> 60µg/ml.
Effective permeability	$>1 \times 10^{-6}$ cm/sec

Source: Ossipov and Porreca (2005)

Note: For CNS disorders, as a result of the blood-brain barrier a large number of potential therapy candidate drugs are rejected prior to clinical trials as a result of failure to meet one or more of the above criterion needed to ensure clinical efficacy via the delivery of the active compound at the correct site.

**Appropriate clinical trial design – defining target patient subsets**

In the later, clinical stage of development, difficulties in diagnosis for spectrum conditions with complex symptomology and large placebo responses are hampering the clinical evaluation of CNS drugs, suggesting additional changes in clinical trial design.

## Recent Parkinson's Related Deals

Date	Component	Source	Partner(s)	Deal Type(s)	Deal Title	Deal Summary
July, 2008	PRX1	Proximagen Neuroscience plc. (Global)	Upsher-Smith Laboratories, Inc. (Global)	Commercialization, Development, License	Proximagen signs license agreement with Upsher-Smith for PRX1	Update on October 14, 2008: Proximagen Neuroscience plc, a UK-based drug discovery and development company, has received its first milestone under the terms of the worldwide licensing agreement signed with Upsher-Smith Laboratories, Inc., a US-based pharmaceutical company. This milestone triggers a \$6 million equity investment in Proximagen at GBP0.022 per share. The milestone was triggered ahead of schedule as Proximagen reported positive pre-clinical results on the PRX1 program. Following this first equity investment, Upsher-Smith will hold 7.1% of the enlarged share capital of Proximagen. Announcement (July 14, 2008): Proximagen Neuroscience plc has entered into a worldwide licensing agreement with Upsher-Smith Laboratories, Inc. The agreement covers the development and commercialization of Proximagen's proprietary PRX1 program for the symptomatic treatment of Parkinson's disease (PD). Proximagen would receive an upfront payment and milestone payments totaling up to \$232 million, plus royalties on global product sales. Upsher-Smith expects to make a \$6 million equity investment in Proximagen. Proximagen is entitled to up to double-digit royalty basis.
June, 2008	Apokyn	Vernalis Plc ADR (US Public)	Ipsen Ltd (Global)	Acquisition	Ipsen acquires Apokyn and its US commercial operations from Vernalis(07/01/2008)	Ipsen S.A., a specialty pharmaceutical company, has acquired Apokyn(R) and its US commercial operations from Vernalis plc, a specialty bio-pharmaceutical company focused on neurology, for a consideration of approximately \$17.5 million. Announcement (June 5, 2008): Vernalis has agreed to sell Apokyn(R) and its US commercial operations to Ipsen S.A., for a consideration of approximately \$17.5 million. The consideration consists of an initial payment of \$6.5 million in cash, and further milestone consideration of up to \$6 million. As part of the sale arrangements, Ipsen has also agreed to take a \$5 million equity stake in Vernalis, at a subscription price per ordinary share of GBP0.07, representing a 20% premium to the average closing price of an ordinary share on the previous three trading days. Apokyn(R) (apomorphine hydrochloride injection) is a therapy used for the treatment of episodes (re-emergence of Parkinson's disease symptoms) associated with advanced Parkinson's disease. The transaction is expected to be completed on or before July 1, 2008. Brunswick Group LLP and Allen & Overy LLP served as advisors to Vernalis and Sullivan & Cromwell LLP served as advisor to Ipsen.

Source: Business Insights CNS Pipeline Databook

**Comprehensive listing of recent deals can be made available in Excel format as part of actual report.**

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