



# Johnson Matthey

Presentation to  
Analysts & Investors

Johnson Matthey Macfarlan Smith

Edinburgh

26th January 2006

# Cautionary Statement

This presentation contains forward looking statements that are subject to risk factors associated with, amongst other things, the economic and business circumstances occurring from time to time in the countries and sectors in which Johnson Matthey operates. It is believed that the expectations reflected in these statements are reasonable but they may be affected by a wide range of variables which could cause actual results to differ materially from those currently anticipated.



Johnson Matthey

Neil Carson  
Chief Executive

# JM Executive Board

- Neil Carson - Chief Executive
- John Sheldrick - Group Finance Director
- David Morgan - Executive Director,  
Corporate Development, Central  
Research and Ceramics
- Dr Pelham Hawker - Executive Director, PCT and  
Pharmaceutical Materials
- Larry Pentz - Executive Director, ECT

# Other Senior Management

- Dr Forrest Sheffy - Division Director, Pharmaceutical Materials
- David Mercer - Managing Director, Macfarlan Smith
- Richard Scullion - Sales & Marketing Director, Macfarlan Smith
- Helen Ogden - Production & Development Director, Macfarlan Smith
- David Elilio - Finance Director, Macfarlan Smith
- Debra Boni - Human Resources Director, Macfarlan Smith
- Ian Godwin - Investor Relations

# Programme

- 9.00 Welcome and trading update (Neil Carson)
- 9.20 Pharmaceutical Materials Division (Forrest Sheffy)
- 9.45 Coffee break
- 10.00 Macfarlan Smith:  
Overview and Key Features (David Mercer)  
Products and Markets (Richard Scullion)  
Production and R&D (Helen Ogden)  
Safety and Security Briefing (Debra Boni)
- 11.15 Depart for site tour
- 13.00 Return to Murrayfield for buffet lunch
- 14.00 Visit wrap up Q&A
- 14.15 Depart for airport / station

# Current Trading

- Trading in line with expectations
- Catalysts Division continues to perform well
- ECT benefiting from growth in diesel products in Europe
- Demand in USA remains weak but sales in China and Japan well up on last year
- Overall ECT on track to achieve 10% profit growth in second half
- PCT also expected to achieve good growth for the year

# Current Trading

- Precious Metal Products had good third quarter and should benefit from the strong platinum price
- Pharmaceutical Materials' sales were up in the third quarter and profits in the second half should be ahead of the first
- Ceramics has maintained the improvement achieved in the first half and should deliver good profit growth for the year
- Following an encouraging first half we are expecting to achieve good growth in earnings for the year





Johnson Matthey



# Johnson Matthey Pharmaceutical Materials Division

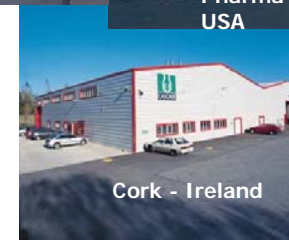
**Forrest K. Sheffy, Ph.D.  
Division Director**





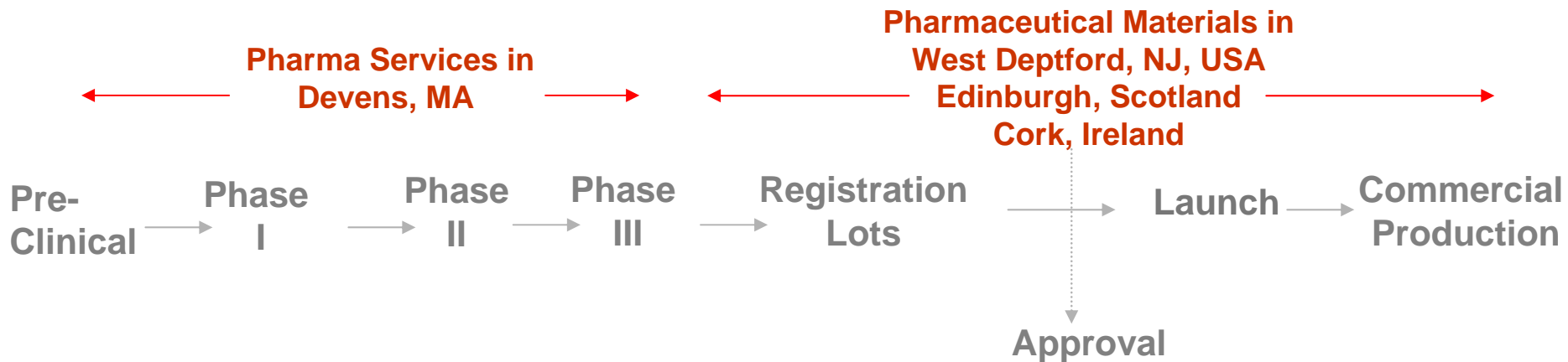
# Business Overview

- ▶ Pharmaceutical Materials sites:
  - ▶ Edinburgh, Scotland
  - ▶ West Deptford, NJ
  - ▶ Devens, MA
  - ▶ Cork, Ireland
- ▶ 590 employees
- ▶ 7 day, 24 hour manufacturing operations





# Market Coverage



- **Complete supply chain provider**
- **Discovery to commercial production**





# Pharmaceutical Materials - USA



- ▶ West Deptford, NJ
- ▶ Manufacture of APIs, especially controlled drugs and platinum pharmaceuticals
- ▶ 145 employees
- ▶ 14 reactor trains, 29,000 gallons





# Pharma Services



- ▶ Devens, MA (near Boston)
- ▶ Contract chemistry focused on drug development, initial start-up
- ▶ 135 employees
- ▶ 2000 gallons total capacity





# Pharmaceutical Materials - Ireland



- ▶ Process development and small scale manufacture of complex molecules (prostaglandins)
- ▶ Lab scale manufacture
- ▶ 35 employees





# Pharmaceutical Materials Division Financial Performance 2001-2005

## UK GAAP

	2000/01 £m	2004/05 £m	Growth p.a.
Sales	35.2	131.8	+39%
Operating profit	18.0	40.0	+22%
ROS	51.1%	30.3%	







# Pharmaceutical Materials Division Macfarlan Smith 2001-2005

- ▶ Overall good volume growth
- ▶ Sales growth is less than volume growth because prices of bulk opiates have steadily reduced over this period





# Pharmaceutical Materials Division Financial Performance 1H 2005/06

## IFRS Basis

	1H 2004/05 £m	1H 2005/06 £m	% change
Sales	66.4	57.9	-13%
Operating profit	21.1	16.2	-23%
ROS	31.8%	28.0%	





# Pharmaceutical Materials Division Financial Performance 1H 2005/06

- ▶ All the decline related to the US, Macfarlan Smith ahead
- ▶ Impact of loss of carboplatin patent (expired October 2004) £5m in full year
- ▶ Contract research revenues also weaker
- ▶ Improvement expected in second half





# Pharmaceutical Materials Division US Operations – Growth Drivers

- ▶ Growth in opiates
- ▶ New generic controlled drug products
- ▶ Increased range of platinum pharmaceuticals
- ▶ Prostaglandins
- ▶ Over 80 new products in development





# Pharmaceutical Materials Division US Operations – Growth Drivers

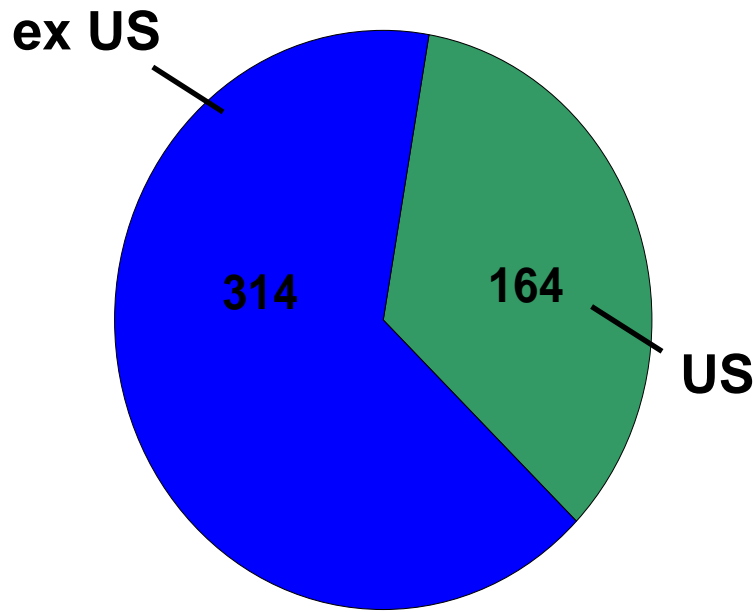
...and royalties (future upside)

- ▶ Fosrenol (Shire). Royalty 1½% of sales p.a.  
Used to treat hyperphosphatemia  
Status: Product launched in US in 2005.  
\$200k royalty received to date  
Analysts project \$200-350m sales in 2009
- ▶ Satraplatin (GPC Biotech). Royalty 7% of sales p.a.  
Used to treat prostate cancer  
Status: Product in phase III clinical trials  
Peak sales potential estimated (Goldman Sachs) at \$500m  
Exclusive supply agreement

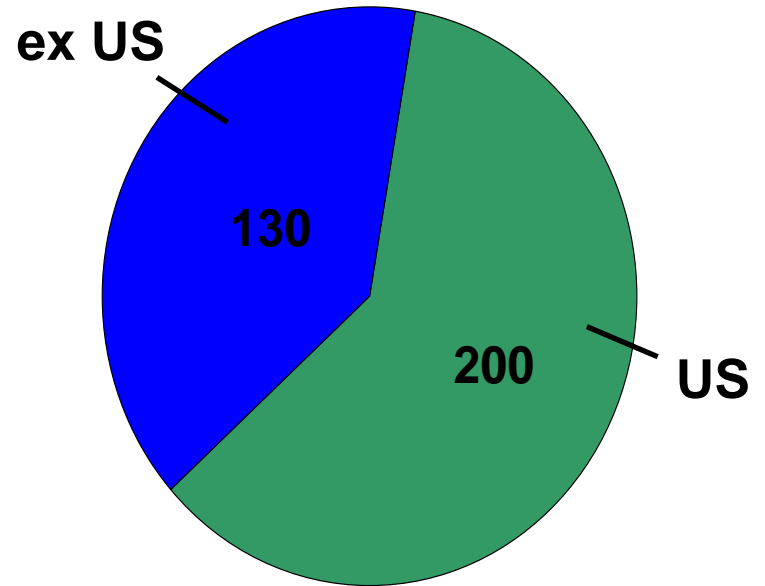




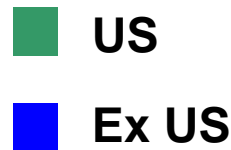
# Opiate API Markets



**By Volume**  
Total 478 tonnes



**By Value**  
(£m)  
Total Sales £330m



Source: JM estimates





# Opiates Trends

- ▶ Overall growth around 6% p.a.
- ▶ Modest growth in established bulk opiate products
- ▶ Growth in specialist opiates products

## For JM

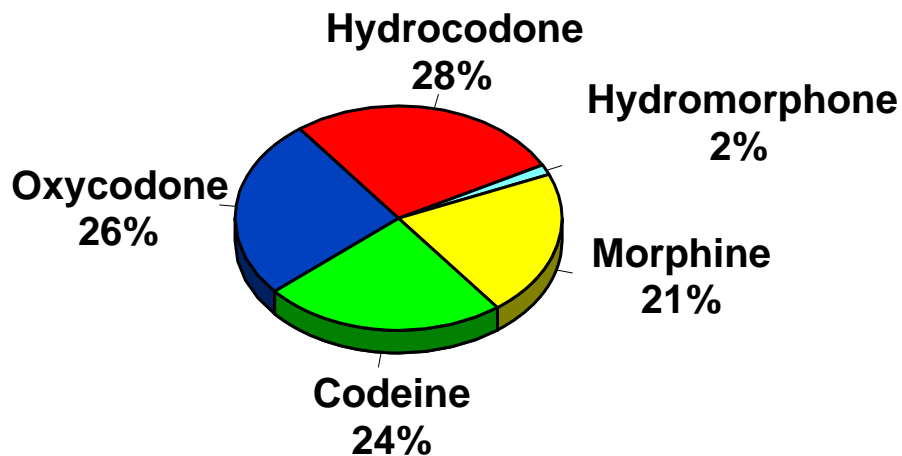
- ▶ Market growth plus product opportunities at Macfarlan Smith
- ▶ Market share growth at West Deptford





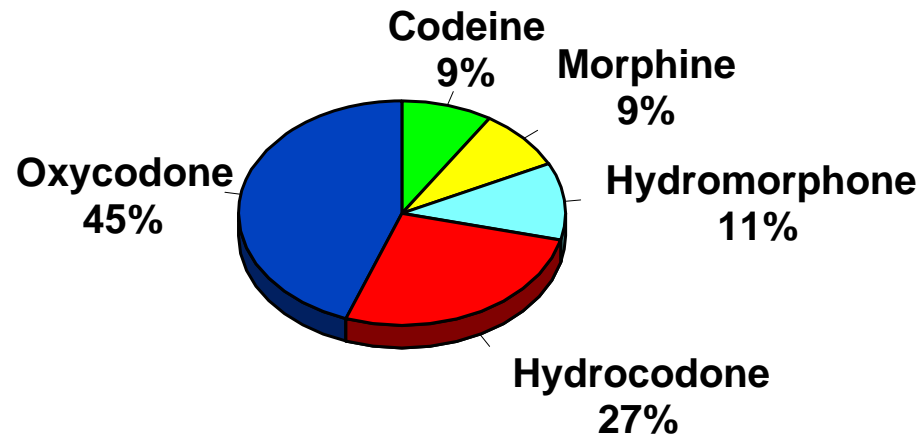
# US Opiates Sales by Product

**Opiate APIs  
by Volume as Salt, tonnes**



**Total Volume 200 tonnes**

**Opiate APIs  
by Sales, \$m**



**Total Market \$400m**

Source: JM estimates







# US Opiates Growth

- ▶ Substantial benefit from use of Macfarlan Smith technology
- ▶ Focus on higher margin, higher growth synthetic products – hydromorphone, hydrocodone and oxycodone
- ▶ Willing market
- ▶ Drug Master Files filed for all
- ▶ FDA approved for 2
- ▶ In late stages of qualification at key customers





# Johnson Matthey

## Macfarlan Smith



**WELCOMES**

**Analysts & Investors**

**January 2006**



# Johnson Matthey

## Macfarlan Smith



**DAVID MERCER**  
**Managing Director**



# MACFARLAN SMITH

Sole manufacturing facility  
based in Edinburgh, Scotland



# A BRIEF COMPANY HISTORY



1780 - J.F. Macfarlan founded

1836 - T & H Smith founded

1906 - T & H Smith move to current site

1960 - Edinburgh Pharmaceuticals formed



1963 - Glaxo Group buy Edinburgh Pharmaceuticals

1990 - Management Buy Out

1995 - Stock Market floatation under Meconic PLC

2001 - Johnson Matthey Plc acquires Meconic PLC

# MACFARLAN SMITH



- World's largest supplier of bulk opiates
- Significant presence in other controlled drugs
- The largest purchaser of "poppy" raw materials
- Niche strengths
  - API manufacture
  - Controlled drugs
  - Bulk opiate actives
  - Natural product extraction
- Global presence
  - 85 countries
  - Excellent market coverage
  - Only manufacturer in the UK
- Supply to leading blue chip companies
- Widest product portfolio of opiate products for pain relief market





# MACFARLAN SMITH

- **267 employees**
  - **Production**           **139**
  - **Sales/Admin**       **47**
  - **Quality**             **32**
  - **Engineering**       **28**
  - **R&D**                 **21**
- **Capacity**
  - **7000 tonnes p.a. biomass extraction**
  - **Total reactor capacity 50m<sup>3</sup>**
  - **Output capacity 200 tonnes**
- **Core skills**
  - **Natural product extraction**
  - **GMP standards**
  - **Small to medium volume**
  - **Regulatory affairs (controlled drugs)**
  - **Unique ability to manufacture all controlled drugs**

# THE REGULATORY ENVIRONMENT

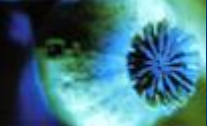


- Single Convention on Narcotic Drugs 1961 and 1971
- Key control mechanism
  - International Narcotic Control Board (INCB)
  - Mandatory estimate system
  - Basis for controlling production, raw materials and manufacture of controlled drugs
  - Imports and exports controlled by the Home Office



**Home Office**





# KEY FEATURES OF MARKETS

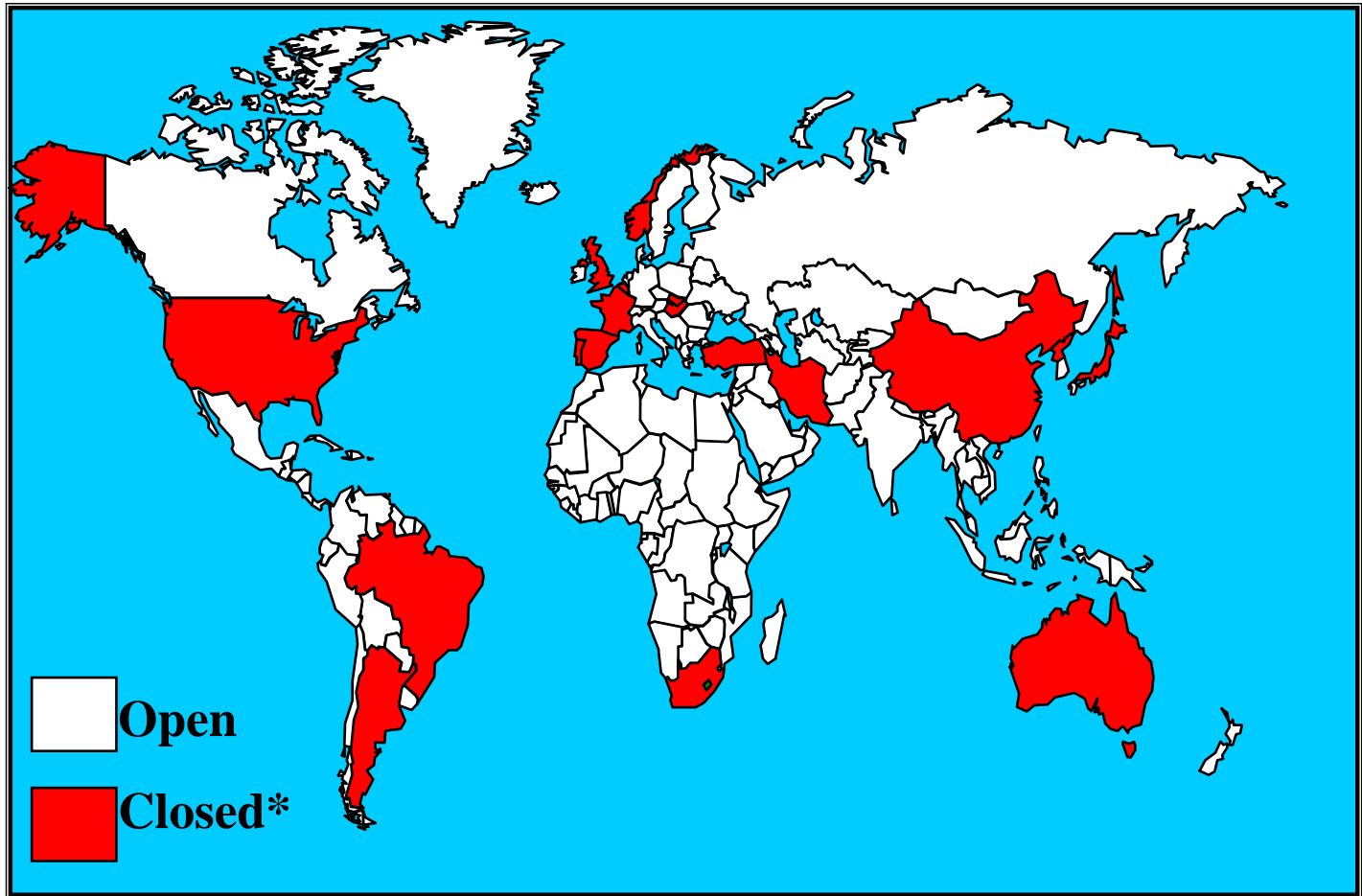
- **Closed markets**
  - Countries with adequate domestic sources of narcotic drugs and not normally importers are generally inaccessible to foreign manufacturers
  - Macfarlan Smith is the only licensed producer of most of the controlled drugs manufactured in the UK
- **Open markets**
  - Countries with limited or no domestic capability, relying on imported narcotics



# THE OPIATE MARKET

## Closed Markets

- Australia
- Argentina
- Belgium
- Brazil
- China
- France
- Hungary
- Iran
- Japan
- Norway
- Portugal
- Slovakia
- South Africa
- Spain
- Turkey
- United Kingdom
- USA



\* markets which do not normally import opiates



# SOURCES OF OPIATE RAW MATERIALS

		AMA	ATA
		Capacity (tonnes)	
<b>OPIUM</b>			
India	Government	100	
<b>CONCENTRATE OF POPPY STRAW (CPS)</b>			
Tasmania	GlaxoSmithKline Tasmanian Alkaloids	110	95
Turkey	Government	70	0
France	Francopia (Sanofi-Aventis)	60	15
Spain	Alcaliber	80	10
Hungary	ICN Alkaloida (Sun Pharmaceutical Industries)	40	2
Slovakia	Slovakopharm	20	0
UK		40	0
		<b>520</b>	<b>122</b>



# RAW MATERIALS

- Two main materials
  - Anhydrous Morphine Alkaloid - AMA
  - Anhydrous Thebaine Alkaloid - ATA
- Raw material strategy
  - Stop the historical pattern of surplus and shortage
  - Balance growing
  - Broaden sources from which JM purchases
  - Develop poppy straw extraction
- Currently
  - Surplus of AMA exists - more than two years stock available
  - More R&D being encouraged in UK
  - JM buys from six sources (previously only two sources)
  - Continue to progress the raw material strategy



# Johnson Matthey Macfarlan Smith

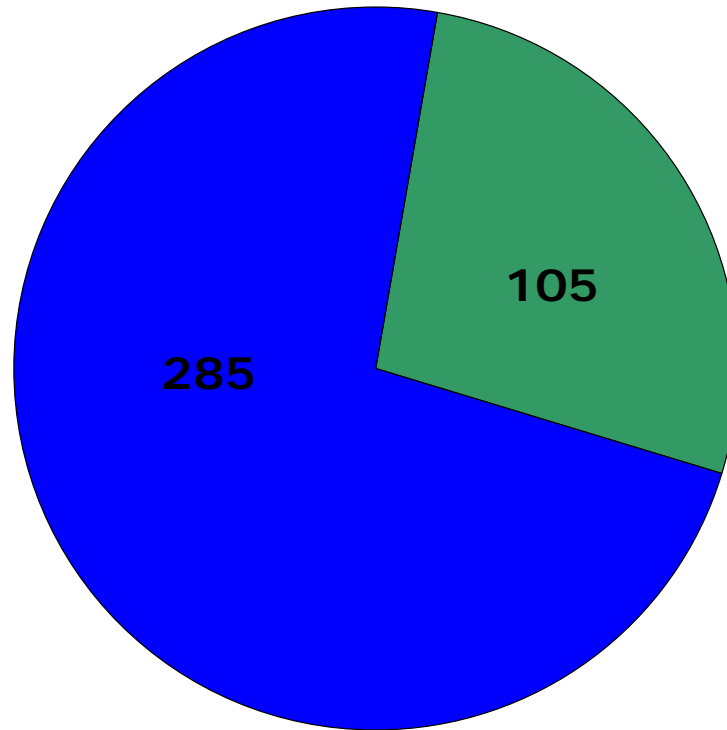


**RICHARD SCULLION**

**Sales & Marketing Director**



# OPIATE API MARKETS (AMA)



■ US  
■ Ex US

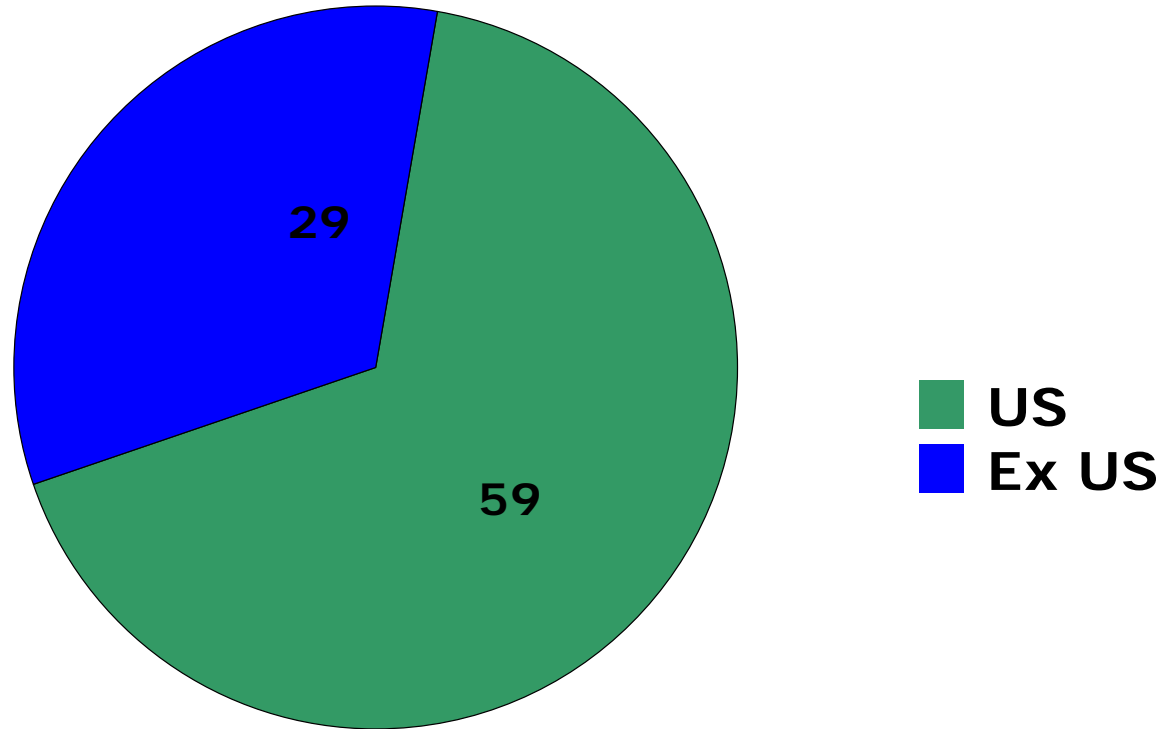
By Volume  
(tonnes AMA)  
Total Volume 390 tonnes

Source: JM estimates



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Macfarlan Smith

# OPIATE API MARKETS (ATA)

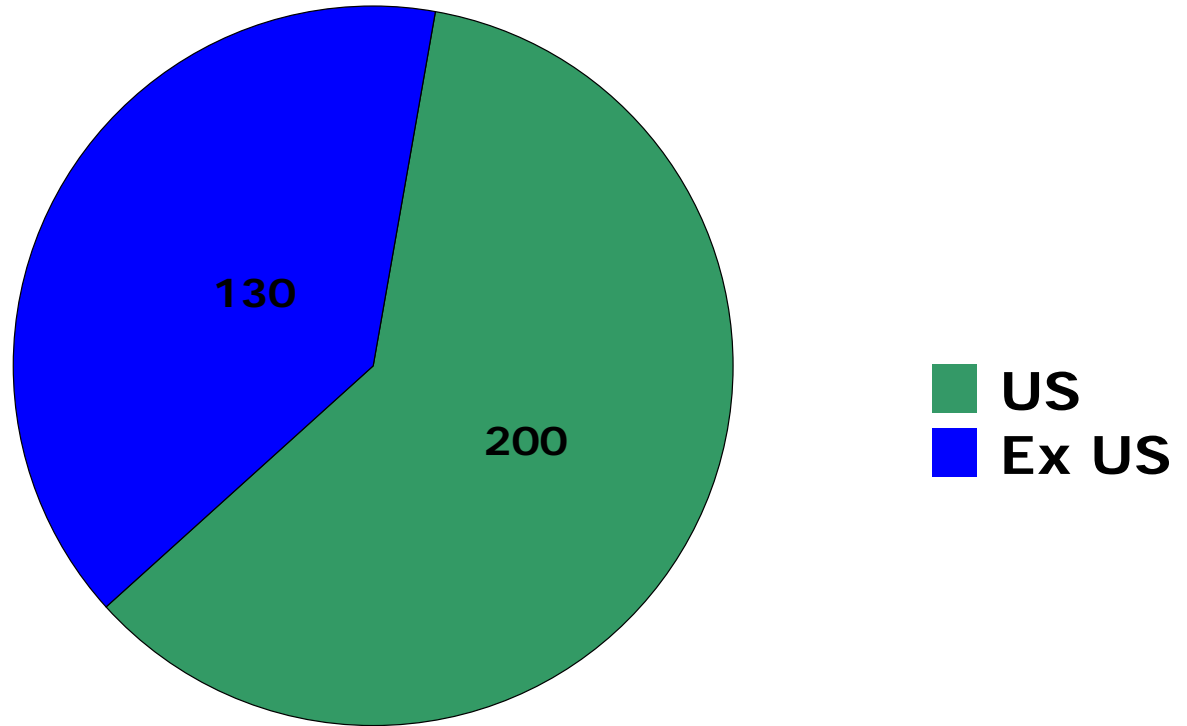


By Volume  
(tonnes ATA)  
Total Volume 88 tonnes

Source: JM estimates



# OPIATE API MARKETS

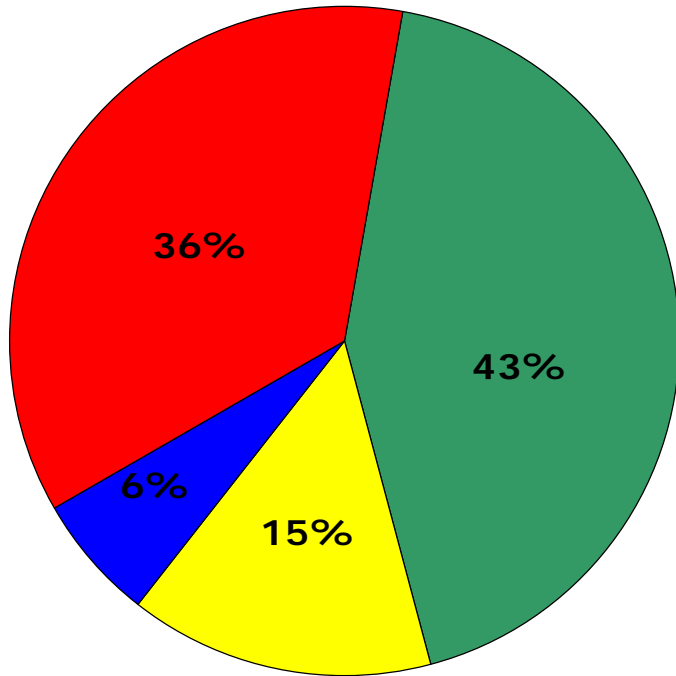


By Value  
(£m)  
Total Sales £330m

Source: JM estimates



# OPIATE API MARKETS - EX US



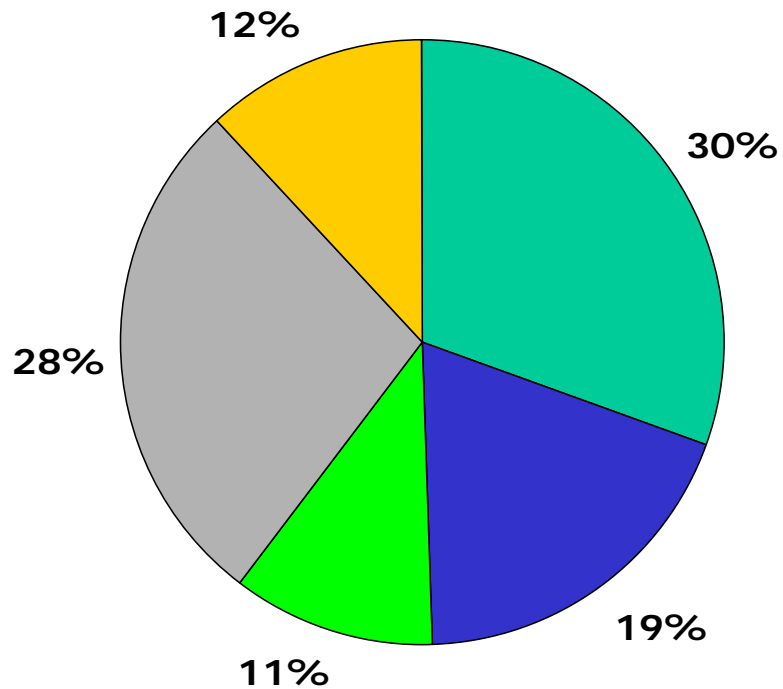
■ Macfarlan Smith      ■ Francopia  
■ Tasmanian Alkaloids   ■ Others

Total Sales £130m

- Overall market growth rate around 6% p.a.
- Growth concentrated in key specialist opiate APIs
- Both Macfarlan Smith and Francopia have strong domestic markets

# COMPETITORS

## Opiate Market Excluding USA (AMA)



	Tonnes	%
UK	84	30%
France	53	19%
Iran	32	12%
Australia	29	11%
Others	77	28%
Total	275	

Source: JM estimates



# PRINCIPAL PRODUCTS

- **BULK OPIATES**

- **Codeine, Dihydrocodeine, Morphine**

**Predominantly pain relief**

- **Pholcodine**

**Antitussive**

- **SPECIALIST OPIATES**

- **Oxycodone, Hydromorphone**

**Pain relief**

- **Diamorphine, Buprenorphine HCL,  
Buprenorphine Base**

**Pain relief/addiction**



# PRINCIPAL PRODUCTS

- **OTHER CONTROLLED DRUGS**

- **Methadone** **Addiction**
- **Fentanyl, Alfentanil, Sufentanil** **Pain relief**
- **Methylphenidate** **ADHD**

- **NON CONTROLLED DRUGS**

- **Apomorphine** **Emetic, Parkinson's, ED**
- **Naloxone, Naltrexone** **Detoxification for opiate addicts**
- **Galantamine** **Alzheimer's**

- **AVERSIVES**

- **Bitrex®** **Poison prevention**

- **INTERMEDIATES**

- **Aloin** **Anti arthritic**



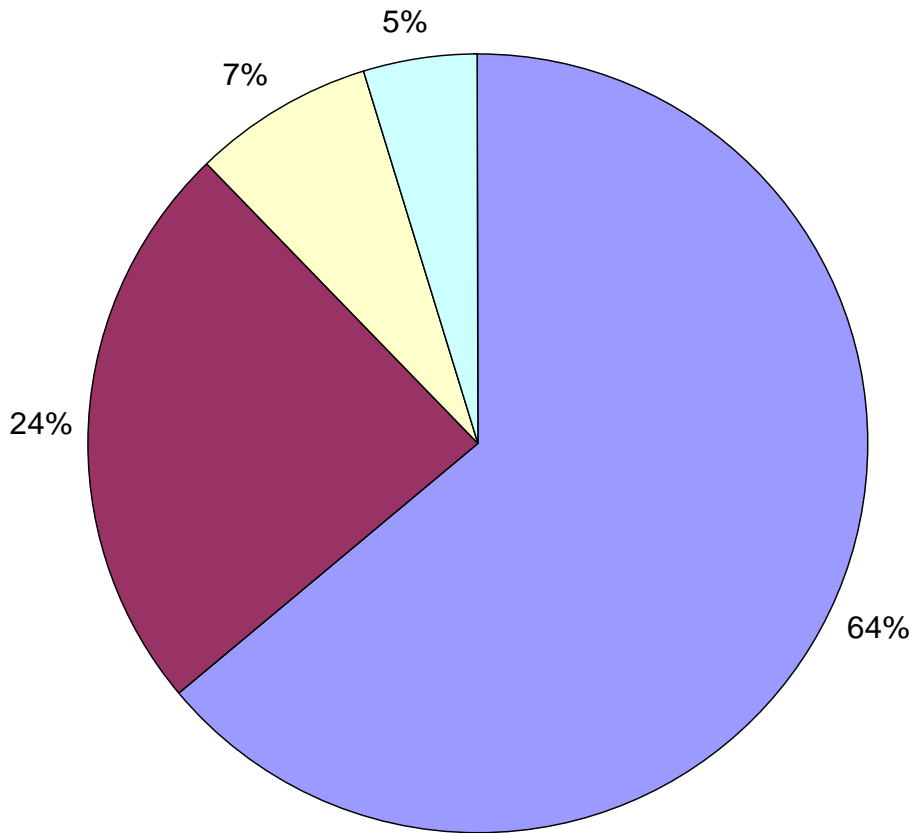


# KEY CUSTOMERS

- **Actavis (Alpharma)**
- **Reckitt Benckiser (Boots Contract Manufacturing)**
- **GlaxoSmithKline**
- **Mundipharma**
- **PD&MS**
- **Sanofi–Aventis**
- **TRB Chemedica**
- **TEVA**
- **Winthrop Pharmaceuticals (Sanofi-Aventis)**
- **Wockhardt**



# SALES BY GEOGRAPHICAL AREA 2004/05





# MARKET SUMMARY

- Organic growth in bulk opiates based on ageing population and developing markets
- Strong performance of Oxycodone and Buprenorphine contributing to growth in specialist opiates
- Generic opportunities for Fentanyl increasing
- New product opportunities in natural extraction



# Johnson Matthey

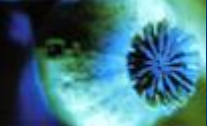
## Macfarlan Smith



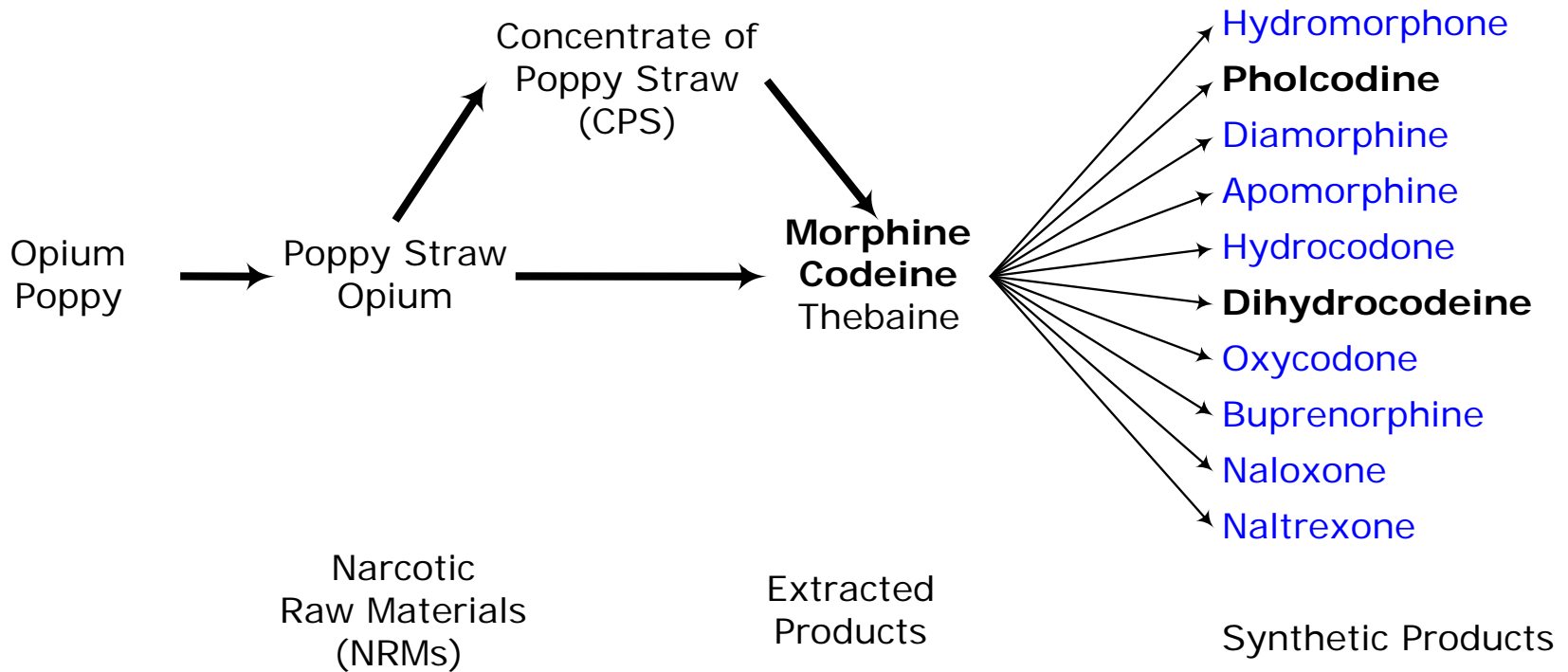
**HELEN OGDEN**

**Production & Development Director**





# OPIATE PRODUCTS



- **Bold Face indicates bulk opiate drugs**
- **Blue indicates high margin specialist opiates**



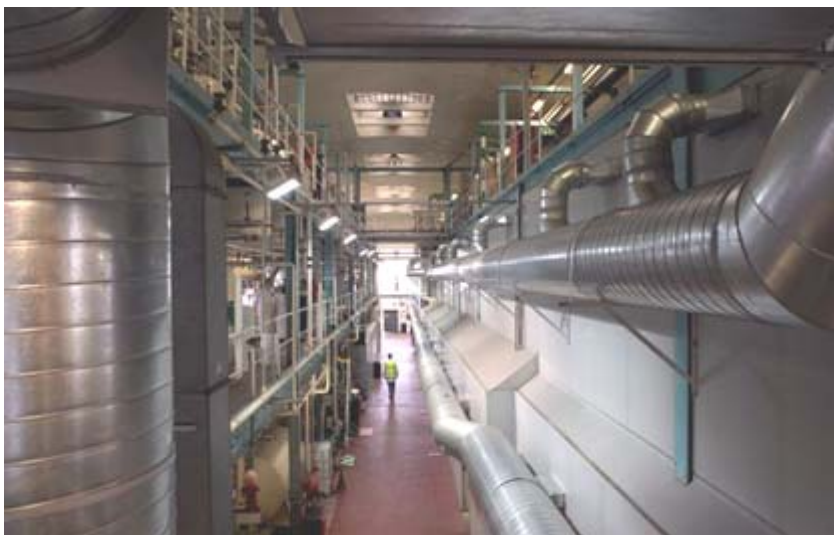
# BLOCK 7



- **Natural product extraction plant, built for Galantamine and modified to extract CPS from poppy straw**
- **Continuous belt extractor rated at 20 tonnes biomass per day**
- **Downstream purification of extracts and isolation of API**



# BLOCK 108



- Bulk opiate manufacturing facility
- Original building opened in 1954
- Steady upgrades to the plant since acquisition
- Recent investment for Codeine manufacture
- Products manufactured in this area: Codeine, Morphine, Diamorphine, Pholcodine, Dihydrocodeine

# BLOCK 120



- Multi-purpose API production facility constructed in two phases
- First phase opened in 2002
- Second phase construction began in 2004, fully commissioned in December 2005
- Products manufactured in this area: Oxycodone, Buprenorphine, Naloxone, Naltrexone

# SMALL SCALE AND POTENTS



- Designed for the manufacture of low volume, high value APIs and clinical trial materials
- Extended in 2005 to provide a facility for the production of highly potent products
- High levels of containment and flexible batch sizes
- Products manufactured in this area: Fentanyl, Sufentanil, Alfentanil, Etorphine, Diprenorphine



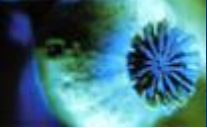
# SITE DEVELOPMENT

- Significant investment in the last 4 years
- Reactor capacity increased by over 50%
  - multipurpose/specialist opiates
  - high potency products
  - bulk opiates
- Flexibility of extraction capabilities increased
- Security upgrades
- Major upgrades of facilities and equipment for quality, environmental, health, safety and efficiency improvements
  - containment systems
  - solvent abatement
  - purified water
  - process controls



# OPERATIONAL CONTROLS

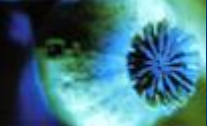
- **Highly regulated environment**
  - **Home Office**
  - **MHRA (Medicines and Healthcare products Regulatory Agency) (UK)**
  - **Food & Drug Administration (USA)**
  - **Scottish Environment Protection Agency**
  - **Health & Safety Executive**
- **Regularly inspected against standards**
- **Changing standards require ongoing assessment**



# MANUFACTURING STRENGTHS

- Established core processes
- Comprehensive range of manufacturing assets
- Natural product extraction and separation technologies
- Supply chain management
- Innovation and flexibility
- Stable/skilled workforce





# R&D OBJECTIVES

- **Develop existing processes to improve robustness, consistency and efficiency**
- **Scale up to maintain growth of existing products**
- **Pursue and assess innovative technologies and processes**
- **Develop efficient, robust processes for new products**



# Johnson Matthey

## Macfarlan Smith



**DAVID MERCER**

**Managing Director**



# STRATEGIC GROWTH

- Demographic change - ageing population
  - New markets - global acceptance of opiate treatment
- Growth areas
  - Generics
  - Treatment for drug addiction
  - New combination products
  - New dosage forms
  - Technology
- Recent capacity has greatly expanded capability in manufacture of specialised opiates and potents
- Continue improvement
  - Scale up, process improvement, introduction of new products
- Benefit from the synergies within the Pharmaceutical Materials Division
- Macfarlan Smith continues to increase its ROA

# Glossary of Terms

<b>ADHD</b>	Attention Deficit Hyperactivity Disorder
<b>AMA</b>	Anhydrous Morphine Alkaloid
<b>APIs</b>	Active Pharmaceutical Ingredients
<b>ATA</b>	Anhydrous Thebaine Alkaloid
<b>Alfentanil</b>	An analogue of Fentanyl (see below)
<b>Alkaloid</b>	One of a large group of organic bases which are found in plants and which possess specific physiological actions
<b>Aloe</b>	The dried juice of the leaves of various species of <i>Aloe</i>
<b>Aloin</b>	A purgative isolated from aloe. Also used as an intermediate in the manufacture of diacerein.
<b>Anaesthetic</b>	An agent producing insensibility
<b>Analgesic</b>	An agent that relieves pain
<b>Antitussive</b>	An agent which prevents or relieves coughing
<b>Bitrex®</b>	Macfarlan Smith trade name for denatonium benzoate, a highly potent bittering agent added to toxic substances as a deterrent to accidental ingestion
<b>Bulk Active / Bulk Opiate / Bulk Controlled Drug</b>	The pure drug substance used in formulating the final dosage form

<b>Buprenorphine</b>	A synthetic derivative of thebaine, used as an analgesic. Also used in drug addiction therapy
<b>CPS</b>	Concentrate of Poppy Straw
<b>Codeine</b>	An analgesic of moderate potency and antitussive found in opium or produced synthetically from morphine
<b>Diamorphine</b>	A semi-synthetic opiate and powerful analgesic also known as heroin. Although severely restricted in most countries, it remains in medical use in the UK mainly as a powerful analgesic. Used in recent years to treat severe drug addiction
<b>Dihydrocodeine</b>	An opiate analgesic. More potent than codeine and suitable for treating pain of moderate severity
<b>Diprenorphine</b>	Antidote to Etorphine
<b>Dosage forms</b>	Finished preparations - tablets, injections, creams, ointments, linctuses, etc.
<b>Drug Master File</b>	A dossier containing details of the specification, manufacture, analysis and stability of a bulk active. They are submitted to the MHRA (UK) FDA (US) EDQM (EU) and other regulatory bodies
<b>ECT</b>	Environmental Catalysts and Technologies
<b>ED</b>	Erectile Dysfunction
<b>EDQM</b>	European Directorate for the Quality of Medicines
<b>Etorphine</b>	A highly potent anaesthetic used in veterinary applications
<b>FDA</b>	Food and Drug Administration (US)

<b>Fentanyl</b>	A highly potent synthetic narcotic analgesic used in surgery
<b>GMP</b>	Good Manufacturing Practice, a totally quality system designed to ensure that pharmaceutical actives are produced consistently to a quality appropriate to their use
<b>HCL</b>	Hydrochloride
<b>INCB</b>	International Narcotics Control Board
<b>MHRA</b>	Medicines and Healthcare products Regulatory Agency (UK)
<b>Morphine</b>	The principal pain killing component of opium and CPS. Used in the treatment of severe pain. It is the standard against which many pain control agents are measured. Also the key building block of the manufacture of other opiates
<b>Naloxone</b>	An opiate antagonist used to reverse the effect of opiates
<b>Naltrexone</b>	(See <i>Naloxone</i> above)
<b>Natural Extracts</b>	Chemicals extracted from naturally occurring raw materials
<b>Opiates</b>	Compounds originating from the milky juice of the <i>Papaver somniferum</i> including opium, morphine, codeine and their derivatives
<b>Opium</b>	Dried latex exudate of the seed capsule of <i>Papaver somniferum</i> , used as a raw material in the production of opiates
<b>Oxycodone</b>	An opiate used to relieve medium to severe pain

<b>PCT</b>	Process Catalysts and Technologies
<b>Papaver Somniferum</b>	The opium poppy
<b>Parkinson's disease</b>	A progressive degenerative disease of the nervous system characterised by tremor, muscular rigidity and emaciation
<b>Pholcodine</b>	A derivative of morphine used as an antitussive
<b>Poppy Straw</b>	The dried seed capsule of <i>Papaver somniferum</i> , from which CPS is derived
<b>ROA</b>	Return on Assets
<b>ROS</b>	Return on Sales
<b>Semi-synthetic</b>	Manufactured partly from intermediaries and partly from natural extracts
<b>Specialist opiates</b>	Opiates other than codeine, dihydrocodeine and morphine and pholcodine, for example, diamorphine and hydromorphone
<b>Sufentanil</b>	An analogue of Fentanyl (see above)
<b>Thebaine</b>	A toxic alkaloid obtained from opium and CPS



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