

Drug Delivery Technology: Developing a New Generation of Vaccines

Use the incisive analysis, commentary, opinions and forecasts provided in this note to:

- gain an in-depth understanding of the technology landscape for vaccines and vaccine delivery technologies including immune potentiators, adjuvant delivery systems, delivery of DNA vaccines, delivery to the mucosal system and skin, needle-free delivery and single shot vaccines
- assess the options available for delivering DNA vaccines now & in the future
- assess the potential of mucosal delivery options for emerging products
- gauge the current & future technology requirements of manufacturers developing the new generation of vaccines
- analyze how the market is evolving & the influence that delivery may have on the development of prophylactic vaccines for complex and emerging infectious diseases, biodefense vaccines and therapeutic vaccines
- identify key pharma & delivery specialists focusing on the improved delivery of prophylactic and therapeutic vaccines



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KEY FINDINGS:

- The 2006 global vaccines market is worth around US\$9billion.
- This market has attracted attention of specialty pharma and is of increasing interest to big pharma. The major players in the field are GlaxoSmithKline, Novartis, MedImmune (acquired by AstraZeneca), Merck & Co, sanofi-aventis and Wyeth.
- Challenges remain to ensure the safe and efficient manufacture and delivery of vaccines and the promotion of a sufficient humoral and cellular response to provide long-term immunity.
- Forecasts for near-term (2006-2012) and future (2020) market growth based on the technology platforms evaluated in the report.
- Plus, sales forecasts for approved and pipeline vaccines and adjuvants.
- Many new vaccines (bacterial, protein, DNA and viral based vaccines) will reach the market over the next 6 years, driving future market growth.

Their success is analyzed in detail and case studies are provided to highlight the progress of each technology.

- Researchers are increasingly using rational drug development techniques to identify immune potentiators that stimulate specific parts of the immune system resulting in a cellular, humoral and/or mucosal immune response. A number of these agents currently in clinical trials are evaluated in this report.
- Specialists are exploring alternative delivery routes including intranasal, oral, transdermal as well as needle-free injectors and micro-needles for parenteral delivery.
- As our understanding of immunobiology grows and the vaccine market evolves, companies are adopting new approaches in vaccines for emerging diseases and therapeutic vaccines. Pharmaceutical companies continue to license and acquire the necessary skills in order to expand their product portfolio and capitalize on this innovative and expanding marketplace. Market trends, recent alliances and acquisitions are analyzed in detail in the report.

Introduction

“Over the past year, excitement within the industry has been growing as companies start to recognize the potential of vaccines. New insights into immunobiology and delivery systems may allow development of better vaccines and vaccines for a wider range of diseases than was previously possible. The market looks set to explode over the next 5-10 years as a raft of new products based on these new technologies are developed and launched.”

Dr Sara Sleigh

Vaccination is recognized as a cost-effective medical strategy. Vaccines, alongside antibiotics and improved hygiene standards, have been responsible for a steady decrease in morbidity and mortality from infectious diseases worldwide since their introduction early in the 20th century. Currently available vaccines prevent up to 3 million deaths each year and 750,000 children avoid serious disability. Despite this high level of success, almost 7 million children under 5 years old still die each year from infections.

Conventional vaccines have been based on live attenuated, or killed, viruses or bacteria, or recombinant proteins from these organisms. The design of live attenuated vaccines depended to some extent on serendipity and resulted in low success rates; both live attenuated and

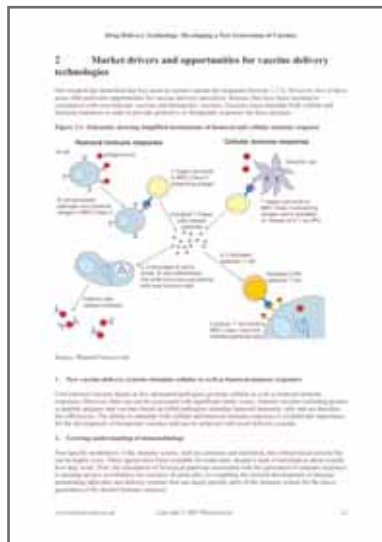
killed vaccines require handling live pathogens and are associated with safety problems. Vaccines based on recombinant protein antigens are not highly immunogenic, proteins can be difficult to manufacture and may have stability issues.

Recent scientific advances have increased our understanding of immunobiology and now allow the more rational design of vaccines. These advances include new delivery technologies that will improve the safety and immunogenicity of traditional vaccines as well as introducing entirely new methods of vaccine delivery such as DNA vaccines. It is largely through the

development of new delivery methods that companies are now aiming to tackle infectious diseases that have evaded vaccine manufacture in the past, develop vaccines for potential diseases related to bioterrorism and launch the new category of therapeutic vaccines.

Vaccines are a vibrant area of pharmaceutical development. The activity in the marketplace has grown steadily over the past few years and looks set to continue and increase in the near future. This report describes the role of new delivery technologies in this rapidly growing field.

SAMPLE PAGES



SAMPLE PAGES FROM THE REPORT



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EIGHT QUESTIONS THIS NOTE ANSWERS:

1. How will the delivery technology drivers change in the vaccine arena during the next decade and beyond?
2. What are the key delivery technologies and devices approved and under development in the vaccines market?
3. When are products and devices which utilize these key delivery technologies likely to reach the market?
4. Which delivery technologies and agents are likely to win in the near-term and the long-term, and why?
5. Which companies are the winners in each technology category?
6. How are delivery technologies evolving to meet the demands of vaccine manufacturers who are now targeting emerging diseases, biodefense and therapeutic vaccines?
7. Where are the market opportunities now and in the future?
8. What do we predict will be the value of the vaccines delivery market each year until 2012, in 2015 and in 2020?

COMPANIES MENTIONED:

Acambis, ACE Biosciences, Allergy Therapeutics, Alba Therapeutics, Alphavax, Altea Therapeutics, AnGes MG, Antares Pharma, Antigenics, Corixa (acquired by GlaxoSmithKline), Avant Immunotherapeutic, Bavarian Nordic, Baxter Healthcare, Bayhill Therapeutics, Becton Dickinson, Berna Biotech, Bharat Biotech International Limited, Biomira (shortly to change its name to Oncothyreon), Bioject Medical Technologies Inc, BioVex, BN Immunotherapeutics Inc, Brookwood Pharmaceuticals, Cambridge Biostability, Celldex Therapeutics Inc, Cerus Corporation, Coley Pharmaceuticals (acquired by Pfizer), CrossJect Medical Technology, Crucell, CSL Ltd, Cure Vac, Cytos Biotechnology, CytoPulse Sciences Inc, DelSite, Dynavax Technologies, DynPort Vaccine Company, Eli Lilly, Eiffel Technologies, Eisai, Emergent Biosolutions, EPFL, Eurocine Vaccines, GeneVac, GlaxoSmithKline, Genexine, Glide Pharma, GlobelImmune, GeoVax, Ichor Medical Systems, ID Biomedical Corporation, Idera Pharmaceuticals, Iomai Corporation, Immutep, Intercell, Introgen Therapeutics, InovivoGen, Inovio, Injex, LigoCyte Pharmaceuticals, MedImmune (acquired by AstraZeneca), Merck & Co, Merck KGaA, Midatech Group, NanoBio, Nanomed Pharmaceuticals, NanoPass Technologies, NanoVic, NasVax, Nventa (formerly Stressgen Biotechnologies), Novartis, Novavax, OctoPlus, OM Pharmaceuticals, Oxford BioMedica, Panacea Biotech, PenJet Corporation, Pevion Biotech, Pfizer, Pharmexa, PowderMed (previously part of Chiron Corporation, acquired by Pfizer), pSivida, Roche, Sanofi Pasteur, sanofi-aventis, Targeted Genetics, Therion Biologics, Transgene, Valeritas, VaxInnate, Vaxiion Therapeutics, Vaxin Inc, VGX Pharmaceuticals, Vical Inc, Virxsys, Wyeth, Zogenix, 3M Pharmaceuticals.

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Table of Contents

1	The vaccine market: opportunities for novel delivery technologies.....	6
1.1	Introduction.....	6
1.2	Overview of the market.....	7
1.2.1	Market size.....	7
1.2.2	Key pharma players.....	8
1.2.3	Key areas of vaccine development.....	9
1.3	Product pipeline.....	11
2	Market drivers and opportunities for vaccine delivery technologies.....	13
3	Leading vaccine delivery companies.....	15
4	Immune potentiators and adjuvants.....	18
4.1	Immune potentiators.....	19
4.1.1	Pattern recognition receptors.....	19
4.1.2	Case Study: VaxImmune™ (Coley Pharmaceuticals).....	23
4.1.3	Host-derived immune potentiators.....	24
4.1.4	Case study: Oncophage® (Antigenics).....	24
4.1.5	Case study: ImmuFACT™ (Immutep).....	25
4.2	Adjuvant delivery systems.....	26
4.2.1	Alum.....	26
4.2.2	Emulsions.....	26
4.2.3	Case study: Stimulon® (Antigenics).....	26
4.2.4	Iscoms (immunostimulating complexes).....	27
4.2.5	Liposomes.....	27
4.2.6	Virosomes.....	27
4.2.7	Virus-like particles (VLPs).....	28
4.2.8	Case study: VLPs in therapeutic vaccines (Cytos Biotechnology).....	29
4.2.9	Microparticles/nanoparticles.....	30
4.3	Our opinion on adjuvant technologies.....	32
5	Delivering DNA vaccines.....	33
5.1	Viral delivery methods.....	33
5.1.1	Adenovirus vectors.....	34
5.1.2	Case study: AdVac® (Crucell).....	35
5.1.3	Poxvirus vectors.....	36
5.1.4	Case study: TroVax® (Oxford BioMedica).....	38
5.1.5	Alphavirus vectors.....	38
5.1.6	Adeno-associated virus.....	39
5.1.7	Other viral vectors.....	39
5.1.8	Case study: ChimeriVax™ (Sanofi Pasteur).....	40
5.1.9	Case study: ImmunoVEX® (BioVex).....	41
5.2	Bacterial delivery methods.....	41
5.3	Complexed DNA.....	42
5.3.1	Case Study: cationic lipid delivery system Vaxfectin™ (Vical Inc).....	42
5.4	Delivery of uncomplexed DNA.....	43
5.4.1	Case study: TriGrid™ Delivery System (Ichor Medical Systems).....	45
5.4.2	Case Study: PowderJect technology (PowderMed, part of Pfizer).....	46
5.5	Our opinion on DNA vaccine delivery technologies.....	47
6	Vaccine delivery to the mucosal system and skin.....	48
6.1	Intranasal and inhaled vaccine delivery.....	48
6.1.1	Case study: polycationic liposomes (NasVax).....	50
6.1.2	Case study: Modulation of Tight Junction Biology (Alba Therapeutics).....	50
6.2	Oral vaccine delivery.....	51
6.2.1	Case study: oral delivery with live bacterial vectors (Avant Immunotherapeutics).....	53
6.3	Plant-derived vaccines.....	54
6.4.1	Case study: the PassPort™ Patch (Altea Therapeutics).....	56
6.5	Our opinion on mucosal and skin delivery technologies.....	57
7	Needle-free delivery.....	58
7.1	Liquid jet injectors.....	58
7.1.1	Case study: Biojector 2000 and VitaVax (Bioject Medical Technologies Inc).....	59
7.2	Solid dose injectors.....	60
7.2.1	Case study: Glide Pharms' Solid Dose Injector.....	60
7.3	Our opinion on needle-free delivery technologies.....	62
8	Single-dose vaccines.....	63
8.1.1	Case study: OctoVax™ (OctoPlus).....	63
8.1.2	Case study: stabilizing vaccines in glass microspheres (Cambridge Biostability).....	64
9	Market trends in drug delivery in vaccines.....	65
9.1	Key vaccine delivery companies.....	65
9.2	Recent partnerships and acquisitions.....	68
9.3	Market trends 2006-2012.....	71
9.3.1	Global vaccine delivery market 2006-2012.....	71
9.3.2	Pharma drivers and vaccine delivery trends by 2012.....	72
9.4	Market by 2020.....	73
9.4.1	Global vaccine and vaccine delivery markets by 2020.....	73
9.4.2	Pharma drivers and vaccine delivery trends by 2020.....	73
9.5	Summary & Conclusions.....	75
10	Bibliography.....	76
11	Acknowledgements.....	78

List of Figures

Figure 1.1: Global vaccine market sales 2006.....	7
Figure 1.2: Leading vaccine brands 2006.....	8
Figure 1.3: Leading companies' vaccine sales (2006).....	8
Figure 1.4: Key areas of vaccine development.....	9
Figure 1.5: Numbers of vaccines in clinical development 2006.....	11
Figure 2.1: Schematic showing simplified mechanisms of humoral and cellular immune response.....	13
Figure 2.2: Vaccine delivery opportunities.....	14
Figure 4.1: Pathway of events following TLR9 activation by CpG oligonucleotides.....	21
Figure 5.1: Oxford BioMedica's therapeutic cancer vaccine TroVax®.....	38
Figure 5.2: The TriGrid™ Delivery System from Ichor Medical Systems.....	45
Figure 5.3: Schematic diagram of the PowderJect device configured for preclinical use.....	46
Figure 6.1: Nasal anatomy.....	48
Figure 6.2: Tight junction biology.....	51
Figure 6.3: Avant Immunotherapeutic's live bacterial vaccine vector.....	53
Figure 6.4: Use of the PassPort™ Patch and Applicator from Altea Therapeutics.....	56
Figure 7.1: Components of the Biojector 2000 device.....	59
Figure 7.2: Glide Pharmaceuticals Solid Dose Injector.....	60
Figure 9.1: Predicted influence of vaccine delivery technologies to 2020.....	74

List of Tables

Table 1.1: Anticipated vaccine sales as a percentage of overall pharma sales 2009-2012 for the top 5 companies.....	9
Table 1.2: Vaccines in clinical development.....	12
Table 3.1: Leading vaccine delivery companies.....	15
Table 4.1: Classification of vaccine adjuvants.....	18
Table 4.2: Pattern-recognition receptors.....	19
Table 4.3: Toll-like receptor agonists currently in development for vaccines.....	20
Table 4.4: Key characteristics of CpG ODNs.....	22
Table 4.5: Examples of current vaccine development programs with CpG ODNs.....	23
Table 4.6: Vaccines in development containing host-derived immune potentiators.....	24
Table 4.7: Virosome-based vaccines in development.....	28
Table 4.8: Advantages and disadvantages of VLP-based vaccines.....	28
Table 4.9: VLP-based vaccines for infectious disease.....	29
Table 4.10: Cytos Biotechnology development pipeline for VLP-based therapeutic vaccines.....	30
Table 5.1: Advantages and disadvantages of DNA vaccines.....	33
Table 5.2: Adenovirus-based vaccines in clinical development.....	35
Table 5.3: Licensees of Crucell's PER.C6 and AdVac® technology.....	36
Table 5.4: MVA-based vaccines in development.....	37
Table 5.5: Alphavax vaccine development programs.....	39
Table 5.6: Other viral vectors under consideration for vaccine delivery.....	40
Table 5.7: ChimeriVax™ products in clinical development.....	41
Table 5.8: GlobelImmune's product pipeline.....	42
Table 5.9: Vaccine candidates under development by Vical and its partners.....	43
Table 5.10: Companies developing electroporation devices for DNA vaccine delivery.....	44
Table 5.11: Pipelines of DNA vaccines delivered using electroporation.....	44
Table 5.12: PowderMed's vaccine pipeline.....	46
Table 6.1: Key companies advancing intranasal vaccine delivery.....	49
Table 6.2: Product pipelines of key companies advancing oral vaccine delivery.....	52
Table 6.3: Key companies developing vaccines for delivery through the skin.....	55
Table 6.4: Concealed mini-needle and micro-needle devices.....	55
Table 7.1: Examples of liquid jet injectors for needle-free vaccine delivery.....	59
Table 9.1: Summary of leading vaccine delivery companies.....	65
Table 9.2: Summary of recent alliances, agreements and acquisitions with vaccine delivery companies.....	69
Table 9.3: Forecasts of approved delivery driven vaccine products 2006-2012.....	71
Table 9.4: Forecasts of pipeline DD driven vaccine products 2006-2012 (US\$ million).....	72
Table 9.5: Forecast of vaccine delivery market 2012-2020 (US\$ billion).....	73