Starpharma Pty. Ltd. – DEP™ drug delivery

About Starpharma

- ASX300 company (ASX:SPL) and (OTCQX:SPHRY)
- Three business areas: DEP™ drug delivery platform, VivaGel® and Agrochemicals supporting a deep portfolio of products under development or on market
- DEP™ drug delivery platform has the potential to produce a portfolio of new DEP™ products with multiple revenue streams
  - Multi product DEP™ license with AstraZeneca valued up to US$126M in milestones plus royalties (first product) and up to US$93M plus royalties for subsequent products
  - DEP™ docetaxel and internal DEP™ pipeline has potential to deliver multiple and high value additional deals
  - DEP™ based partnered programs in place and under discussion with multiple leading pharmaceutical companies including new program for a product in AZ’s portfolio
- VivaGel® portfolio focused on women’s and sexual health
  - VivaGel® condom launched in Australia with further approvals and launches to follow
  - VivaGel® BV - Two products for Bacterial Vaginosis – first approved in Europe, second in phase 3 clinical trial
- Agrochemical program based on SPL’s novel dendrimer technology with extensive commercial partnerships plus internal programs

Starpharmanas DEP™ platform: polylysine dendrimers

DEP™ platform: Benefits

- Expanded therapeutic window by:
  - Improved efficacy
  - Tumour targeting and reduction/elimination of dose related toxicities
  - Extended plasma half life reduces drug elimination and provides greater exposure to drug – may also provide opportunity for less frequent dosing
  - Simplified handling and dosing due to increase in solubility with no excipients (e.g. Polysorbate 80) required
  - Product lifecycle management
Passive Drug delivery

1: Preferential accumulation of drug loaded DEP™ conjugates in tumours
2: Drug is released in tumour from DEP™ backbone according to linker strategy
3: Drug enters tumour cells inducing cell death and tumour regression

DEP™ docetaxel - Preclinical

Docetaxel
Linker
PEG
DEP™ dendrimer

DEP™ docetaxel clinical

Phase 1:
- Open label study, 25-30 cancer patients
- DEP™ docetaxel administered intravenously (no steroid pre-treatment is required)
- No neutropenia (docetaxel DLT) or alopecia reported compared to severe neutropenia suffered by 75% of patients given Taxotere®
- A significant proportion of DEP™ docetaxel patients have exhibited efficacy signals/anticancer activity including at relatively low doses (20mg/m²) in tumours incl. prostate, lung, H&N, gastro-oesophageal, glioblastoma
- Enhanced pharmacokinetics (longer half-life, higher AUC and lower Cmax)

DEP™ docetaxel vs. Taxotere®

1. Elimination of major dose-limiting side effect (neutropenia)
2. Detergent-free formulation (less toxic)
3. Tumour-targeting (40-70x more)
4. Extended duration (half-life)
5. Improved efficacy (breast, ovarian, prostate)

Note: Similar results have been observed in pre-clinical models with other cytotoxic drugs including cabazitaxel and others
Targeted DEP™ Drug Delivery

Starpharma’s targeted DEP™ conjugates provide;
• Greater homogeneity
• High affinity
• Site specific attachment of drug conjugate
• Attachment of multiple drug loaded dendrimers
• The delivery of significantly higher payload levels than conventional ADC’s

Preclinical study to evaluate the efficacy of HER-2 targeted DEP™ conjugates against ovarian cancer xenografts

Method:
• SKOV-3 tumour model in NOD SCID mice
• s.c. implantation
• Allow tumor to grow to >100mm³
• Treatment groups
  • Vehicle*,
  • Ab Targeted DEP™ drug conjugates
  • Kadcyla [10mg/kg*]
  • Herceptin [30mg/kg bi-weekly for 3 weeks]
• * Weekly (days 1, 8 and 15) via iv route for 3 weeks at 0.1ml/10g body weight
• 6 animals/group; Measurement of tumour growth 2-3 times weekly

Results:
• SPL’s novel antibody-targeted DEP™ conjugate resulted in complete tumour regression and 100% survival in an ovarian cancer model
• The antibody-targeted DEP™ conjugate (using Herceptin as the targeting group) significantly outperformed both Roche’s Kadcyla® (T-DM1) and the monoclonal antibody Herceptin* (Trastuzumab) alone
• Targeted DEP™ of significant commercial interest in partnering; patent filings underway
DEP™
Therapeutic and Commercial Proposition

Starpharma’s DEP™ platform is unique in its flexibility, and it provides the ability to:

• Enhance the therapeutic utility of existing drugs or NCE’s through Improved efficacy, tumour targeting, reduction/elimination of dose related toxicities, enhanced PK and solubility
• Develop targeted therapies with homogeneity in structure (easier characterisation and manufacturing) and high payload to targeting moiety ratio. The DEP™ platform is a step above conventional ADC approaches and other nanotechnologies.

The DEP™ platform is a highly versatile platform with significant commercial and therapeutic benefits

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Patents

Starpharma holds a dominant position in the dendrimer IP landscape with a wide portfolio of patents and patent applications covering the composition and application of dendrimers in pharmaceutical, life-science and other fields.

Patents are granted or pending in major markets.