Liquid biopsy from a simple blood test enabling personalised cancer care

Interim Results for the six months ended 31 October 2015

Andrew Newland & Ian Griffiths
28 January 2016
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Parsortix™ commercialisation on track

- Significant progress against key commercial objectives
  - First sales secured
  - FDA authorisation
  - Ovarian cancer clinical application

- Key Opinion Leaders
  - Prostate cancer (Barts Cancer Institute)
  - Breast cancer (University of Southern California)
  - Lung cancer (Cancer Research UK Manchester)

- Peer-reviewed papers
- Patent portfolio strengthened
- Eminent scientific advisors added

“The Parsortix system has a unique combination of features making it suitable for routine clinical analysis of patient blood samples.”

Ged Brady, Cancer Research UK Manchester Institute
Cancer Research UK: “One in two people born after 1960 in the UK will be diagnosed with some form of cancer during their lifetime.”

- Each patient’s cancer is different
- Patient’s cancer changes over time
- Effective treatment requires personalised care
- Reducing healthcare costs

Major pharma developing more selective drugs
- Colorectal cancer KRAS- Erbitux (Merck Serono)
- Lung cancer EGFR+ Iressa (AstraZeneca)
- Breast cancer HER2+ Herceptin (Genentech)
Obtaining cancer cells for analysis

Existing approach: solid tumour biopsy

- Clinicians cut out part of the tumour and analyse the cancer cells
  - Breast cancer mastectomy or lumpectomy
  - Colorectal cancer colonoscopy tumour biopsy
  - Prostate cancer fine needle biopsy and prostatectomy

- Difficulty in accessing some tumours
  - Pancreatic cancer, Lung cancer, Brain cancer

- Repeat tumour biopsy problematic

New approach: liquid biopsy

- Harvest intact cancer cells from blood
- Non-invasive, repeatable, real time, cost effective
- But only one CTC in one billion blood cells

Whole blood from a simple peripheral blood draw contains approximately one cancer cell per ml of blood. The cancer cells are circulating tumor cells shed by the primary tumour in the process of metastasis. The CTCs travel in the blood and if they take root in another organ are the cause of a secondary cancer at a new location.
ANGLE’s patented Parsortix system

- Stepped, microscale cell separators for fluid flow and cell separation
- Two granted US Patents
  - Granted patents in China, Canada and Australia
- Patents pending worldwide
  - European patent expected
Market size and drivers

- Total addressable market for liquid biopsy US$14 billion in the United States market alone by 2025

- Four key market segments
  - Diagnostic screening
  - Therapeutic decision-making
  - Minimal residual disease
  - Post treatment monitoring

- Liquid biopsy comprises ctDNA and CTCs
  - “Whole cells (CTCs) offer the advantage of providing a clinician access to cellular morphology along with other genetic content such as RNA”
  - “CTCs are exceedingly rare ... and more difficult to isolate than ctDNA”


**ANGLE is changing the paradigm by making it easy to isolate CTCs from patient blood for a wide range of cancers**
Parsortix™ and the advantages of CTCs for liquid biopsy

<table>
<thead>
<tr>
<th><strong>Solid Biopsy</strong></th>
<th><strong>Liquid Biopsy</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample Type</strong></td>
<td><strong>Primary Tumor</strong></td>
</tr>
<tr>
<td></td>
<td>Intact cells</td>
</tr>
<tr>
<td><strong>Accessibility</strong></td>
<td>Invasive</td>
</tr>
<tr>
<td></td>
<td>Not always access.</td>
</tr>
<tr>
<td><strong>Repeatability</strong></td>
<td>Difficult</td>
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<tr>
<td><strong>Molecular analysis</strong></td>
<td>DNA</td>
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<tr>
<td></td>
<td>RNA</td>
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<td></td>
<td>Protein</td>
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<tr>
<td><strong>Live cells</strong></td>
<td>Cell culture</td>
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<td></td>
<td>Xenograft</td>
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</tbody>
</table>

**cfDNA**¹
- Fragmented DNA

**CTCs**²
- Intact cells

**Non-invasive**³
- Accessible

**Accessible using Parsortix**⁴

◆ ANGLE’s Parsortix™ system is a patented product, competitively differentiated in a $ multi-billion market

◆ Parsortix™ provides a unique product based solution where others are offering only a laboratory-service based approach

ANGLE is offering customers a Parsortix system for purchase comprising a desktop instrument and a one-time use consumable. Many competitor systems are so complicated that they have to offer a CLIA (certified laboratory) solution where the customer sends them the sample and they operate the system and provide a result. This approach is commercially less attractive as it requires large in-house investment, is less scaleable and deprives the clinical customer of much needed revenue in processing the samples.
## Competitive differentiation in a $ multi-billion market

<table>
<thead>
<tr>
<th>Technology</th>
<th>Name</th>
<th>Simple process</th>
<th>Low cost</th>
<th>Captures all types of cancer</th>
<th>Captures mesenchymal CTCs involved in metastasis</th>
<th>Able to easily harvest cells for analysis</th>
<th>High purity of harvested cells</th>
<th>Cell viability (alive)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microfluidic step</strong></td>
<td>Parsortix</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td><strong>Antibody-based system</strong></td>
<td>CellSearch (only FDA authorised system)</td>
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<tr>
<td></td>
<td>CTC iChip</td>
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<td>×</td>
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<td>AdnaTest</td>
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<td><strong>Membrane-based</strong></td>
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<td>Screencell</td>
<td>✓</td>
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<tr>
<td></td>
<td>CellSieve</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
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<tr>
<td><strong>Centrifugation</strong></td>
<td>Dean Flow</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
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<tr>
<td></td>
<td>Fractionation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td><strong>Cell-free DNA (1)</strong></td>
<td>Alternative process using plasma from blood</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>N/A</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

(1) Cell-free DNA (known as cfDNA or ctDNA) are DNA fragments of dead cells and can only be analysed for DNA using expensive NGS sequencing techniques. RNA analysis is very difficult and limited and protein analysis is not possible with ctDNA. ctDNA fragments thus contain less information than fully intact viable cancer cells and, as they originate from dead cells, may provide less relevant information and miss information on treatment resistant cancer. Viable (live) CTCs can also be used for cell culture and xenografts.
Path to commercialisation

Translational research for clinical applications
Ovarian cancer: Vienna
Breast cancer: USC Norris
Prostate cancer: Barts
Colorectal cancer: MD Anderson
Lung cancer: CRUK
Pancreatic cancer: Cambridge
Others being developed
System optimisation

- Extensive product development and system optimisation successfully completed
  - address operational requirements of a wide range of KOLs and beta customers

- Product development work completed to develop, test, optimise and document key operating protocols
  - enable customers to undertake analysis in specific areas of interest
  - protocol for a single blood sample to be utilised for both CTC and ctDNA analysis
  - opens potential to sell into a large number of research sites using ctDNA

- Parsortix system reliable, easy to use and produces robust reproducible results
  - over 80 Parsortix instruments in active use and this number is growing rapidly
  - over 12,000 blood separations have already been performed on the Parsortix system
  - 6,000 in the current financial year alone to date

- Evidence building of system’s potential to meet the requirements of a wide range of cancer types and forms of analysis
Research use sales progress

- First sales for research use secured after the period end
  - sales to multiple customers of both Parsortix instruments and cassettes
  - customers include both new research users and existing KOLs
  - growing sales pipeline

- Supported by multiple third party cancer centre publications
  - ANGLE’s Parsortix system “… offers a unique combination of features making it suitable for routine clinical analysis of patient blood samples”

- Estimated research use sales market £250m p.a.
  - initial revenues expected to be modest
  - seeking significant contributions from sales to this market over time

- Targeting sales to leading cancer research centres
  - revenues
  - broaden range of users of the system investigating new clinical applications
  - additional posters, publications and clinical evidence
  - new clinical applications and companion diagnostics
FDA authorisation progress

Seeking to be first FDA authorised system for harvesting cancer cells from blood
- appointed full-time FDA experienced clinical studies director
- detailed study plans have been developed and reviewed with the FDA

Strategic decision to pursue FDA authorisation of the system first for metastatic breast cancer with ovarian cancer and other cancer types to follow
- breadth of authorisation to provide flexibility in clinical deployment, allowing a range of downstream analytical procedures
- base authorisation to which (i) additional cancer types and (ii) specific clinical uses can be added facilitating roll out across a wide range of applications

Three world-leading US cancer centres selected
- patient accrual and clinical evidence to secure the FDA authorisation
- major customers in the future
- Key Opinion Leaders in securing uptake of the Parsortix system once FDA secured

Approach adopted provides a strong competitive advantage
Medical University of Vienna

- Highly successful patient study
  - 100% specificity in primary epithelial ovarian cancer (no false positives)
  - 78/80% sensitivity with 7 RNA markers
  - 100% sensitivity with 30 RNA markers

- Parsortix results “sensational”
  - best CTC alternative only 24.5% sensitivity

- Clinical application in triaging patients with abnormal pelvic mass
  - to identify those at high risk of ovarian cancer
  - in US, 200,000 women p.a. have surgery on abnormal pelvic masses c. 10% have cancer
  - Medicare reimbursement of $516/test

- Ovarian sales potential >£300m p.a.

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**Parsortix effectiveness compared to other tests**

**Sensitivity**
The test correctly identifies those with the disease (true positive). A low sensitivity means the test may miss many people who have cancer (false negative).

**Specificity**
The test correctly identifies those without the disease (true negative). A low specificity means patients are told they may have the disease when they do not (false positive).

---

**Key**
- Green: Sensitivity
- Blue: Specificity
- ---: Target level

**Test Result**
- Cancer: Sensitivity, Specificity
- No cancer: True Positive, False Positive, True Negative

---

1. Target for clinical studies
2. Vermillion Inc.
Ovarian cancer clinical application progress

- Simple blood test to identify ovarian cancer prior to surgery for pelvic mass

- Successful pilot study expanded
  - Medical University of Vienna 65-patient study presented at ESMO
  - Unprecedented sensitivity and specificity in identifying ovarian cancer

- Developed detailed study plans to provide clinical evidence

- Product development completed
  - Optimise the methods to maximise CTC capture and purity
  - Optimise PCR-based gene expression analysis techniques

- Three major European cancer centres selected to undertake clinical studies
  - In process of ethics approval

- Parallel studies planned for the United States
  - Leading US cancer centre selected
  - Currently completing internal ethics and research board approval
Other progress: Prostate cancer mesenchymal cells

Barts Cancer Institute

- CTCs harvested in 100% of patients (n=52)
- Barts study demonstrates Parsortix harvested cells are clinically relevant in prostate cancer
- Mesenchymal cells (involved in metastasis) as well as epithelial cells
- Clinically relevant cells harvested

- Barts researchers now investigating molecular biomarkers on the harvested cells to guide effective treatment
Other progress: Breast cancer metastatic biopsy comparison

University of Southern California Norris Comprehensive Cancer Center

- CTCs harvested for RNA Seq analysis in 100% of patients
- CTCs from Parsortix liquid biopsy had similar patterns of gene expression to the traditional biopsy of cancer cells from metastatic sites in all cases (n=4)
- Parsortix liquid biopsy also provides additional clinical information beyond the biopsy of a single metastatic site
- Metastatic biopsies invasive, often requiring surgery, expensive and may delay treatment

Hierarchical two dimensional heat map of 214 genes differentially expressed in CTC and met vs peripheral blood.
Cancer Research UK Manchester Institute and Christie Hospital

- CTCs harvested 100% patients (n=12)
  - Parsortix harvested >5 cells from 100% of patients compared to 58% by leading competitive system
- Suitable for at least four days at room temperature
- Simple plug and play device
- Enables analysis of CTCs not detected by epitope dependent technologies
- Parsortix enables processing a single blood sample for both CTCs and cfDNA

Ged Brady, Cancer Research UK Manchester Institute
“The Parsortix system has a unique combination of features making it suitable for routine clinical analysis of patient blood samples. We have now incorporated the Parsortix workflow into multiple clinical trials and have been accumulating many hundreds of stored enriched samples that will be of immense value in our future CTC studies.”
## Financial Results for the six months ended 31 October 2015

<table>
<thead>
<tr>
<th>Statement of Comprehensive Income</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating costs</td>
<td>(2,399)</td>
<td>(1,578)</td>
</tr>
<tr>
<td>Other income</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Loss before tax from continuing operations</td>
<td>(2,387)</td>
<td>(1,571)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement of Financial Position</th>
<th>31Oct15</th>
<th>30Apr15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade and other receivables and taxation</td>
<td>890</td>
<td>1,008</td>
</tr>
<tr>
<td>Inventories</td>
<td>271</td>
<td>197</td>
</tr>
<tr>
<td>Cash</td>
<td>5,828</td>
<td>8,443</td>
</tr>
<tr>
<td>Property, plant and equipment</td>
<td>476</td>
<td>423</td>
</tr>
<tr>
<td>Intangible assets</td>
<td>1,168</td>
<td>1,149</td>
</tr>
<tr>
<td>Total assets</td>
<td>8,663</td>
<td>11,220</td>
</tr>
</tbody>
</table>

### Comments
- Planned investment in product development and commercialisation
- Planned spend
  - Research use sales
  - FDA studies
  - Ovarian clinical studies
- Geomerics £0.7m received post period end
Anticipated Newsflow

- **Sales growth**
  - cancer drug trials leading to companion diagnostics

- **Results from KOL patient studies**
  - scientific publications
  - new clinical applications
  - growth in sales potential

- **Ovarian cancer clinical study**

- **FDA authorisation**

- **Commercial collaborations**
  - medtech
  - pharma
Parsortix™ patented system provides cells for precision medicine changing the paradigm in a $ billion emerging market

- High performance in ovarian, prostate, breast and lung cancers
- Growing research use sales with a clear competitive advantage
- CE Mark authorised. FDA authorisation in process
- Ovarian cancer first clinical application in development
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