



ANGLE

ANGLE Liquid Biopsy Sample to Answer  
**Presentation to Proactive One2One Healthcare  
Forum**

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- ❖ **Simple blood test for personalised cancer care**
- ❖ Proven performance with multiple Key Opinion Leaders
- ❖ **Emerging \$ multi-billion market (Goldman Sachs \$14bn in US alone by 2025)**
- ❖ Circulating tumor cell (CTC) solution with strong competitive differentiation
- ❖ **Product based solution with instruments and cassettes**
- ❖ Downstream analysis capability provides unique sample to answer solution

# Liquid biopsy improving healthcare and reducing costs: driving precision medicine



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
- ❖ Big pharma developing more selective drugs:
    - Colorectal cancer KRAS- Erbitux (Merck Serono)
    - Lung cancer EGFR+ Iressa (AstraZeneca)
    - Breast cancer HER2+ Herceptin (Genentech)
    - Non small cell lung cancer PDL1+ Keytruda (Merck)
    - Immunotherapies



## 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, lung, brain, liver and bone cancers
- ❖ 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.

Over 90% of cancer deaths are caused by metastasis.

## Animation showing Parsortix™ patented steps



## Video showing blood flowing in Parsortix™ cassette



## Parsortix™ system – the Complete Picture

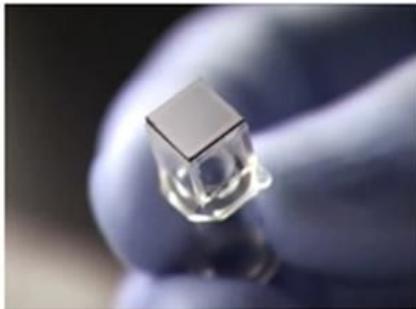
- ❖ Intact CTCs not just ctDNA  
Compatible with existing downstream analysis techniques
- ❖ Parsortix™ system captures living cancer cells  
These cannot be present unless the patient has cancer
- ❖ Evidence-based driven by KOLs and clinical studies
- ❖ Patented product solution
- ❖ Scalable business with third party manufacture



# Axela high performance multiplex downstream analysis solution



Axela's Zplex System incorporating flow-thru expression panels



Axela's Flow-thru TipChip

## ◆ Zplex<sup>®</sup> System

- benchtop laboratory platform designed for routine and focused multiplex analysis of protein or RNA biomarkers
- sample to answer solution for distributed testing under development

## ◆ HyCEAD chemistry

- enables simultaneous measurement of 100s of genes while eliminating multiplex PCR constraints,
- rapid content creation for new applications, >500 target assays to date

## ◆ Consumables

- Flow-thru TipChip<sup>®</sup> containing gene expression/protein expression panels for common pathways or disease processes
- HyCEAD Reagents and assay controls

- ◆ Software: embedded software for method creation, data gathering and data analysis

**well protected as the subject of multiple granted patents**

# Far-reaching market potential



## ANGLE targets

Research use

Screening trials

Basic and translational research  
Drug trials

Clinical use

Ovarian triage  
Prostate biopsy

Metastatic breast

Tissue sample provision

Platform feeding in to existing molecular analysis systems for applications in all cancers in all segments "Parsortix inside"

Emerging \$ multi-billion market (Goldman Sachs \$14bn in US alone by 2025)

- ◆ Evidence-based approach to prove performance with ovarian cancer, FDA breast cancer
- ◆ Substantiating value as sample collection platform
- ◆ Partnering strategy for widespread deployment

- ❖ 400 patient European (ANG-001) and United States (ANG-003) studies
  - Medical University of Vienna, Charité and Vivantes
  - University of Rochester Wilmot Cancer Center
- ❖ **Both studies reported positive results**
- ❖ **Potential to significantly out-perform current clinical care** in discriminating malignant from benign
  - **up to 95% sensitivity and nearly double specificity of CA125**
  - provide valuable gene expression information on malignant cases

- ❖ **Exceptional performance AUC 95.1%**
  - presented at SGO, out-performed all other methods
- ❖ Zplex worked very well with 65 genes in this study
- ❖ **Optimisation in progress to improve performance still further**
- ❖ Further studies (12-18 months) to support launch as a clinical assay
  - opportunities for accelerated commercialisation via commercial partnerships
- ❖ **750,000 women p.a. with abnormal pelvic mass in US market alone**



**Dr Richard Moore, Director of the Gynecologic Oncology Division, University of Rochester Medical Center Wilmot Cancer Institute** “The 200 patient ANG-003 clinical study shows that the Parsortix test has the ability to accurately discriminate malignant from benign pelvic masses prior to biopsy or surgery. The test also offers key additional benefits over existing practice through the gene expression information it provides, which may help to further guide choices for targeted therapy in women with ovarian cancer. Additionally, the test may allow separate identification of patients with low malignant potential and/or other cancer types using a non-invasive liquid biopsy test.”

## Breast cancer FDA clearance progress (400 patient study)

- ❖ **Potential to be first FDA cleared system for harvesting cancer cells from blood**
- ❖ Seeking FDA clearance in metastatic breast cancer
  - breadth of clearance to provide flexibility
  - base clearance to which specific clinical uses can be added
  - ovarian cancer and other cancer types to follow
- ❖ **Analytical studies progressing well**
  - precision and reproducibility
  - limits of quantification and detection
  - accuracy and linearity
  - interferences and carryover
- ❖ ISO13485 QMS system successfully approved for transition to new ISO13485:2016
- ❖ **FDA clearance will differentiate Parsortix in markets worldwide**
- ❖ **ANG-002 clinical study commencing shortly**
  - designed to meet FDA regulatory requirements
  - 200 metastatic breast cancer patients and 200 age appropriate healthy volunteers
- ❖ **MD Anderson, #1 cancer centre in the US, leading primary endpoint analysis** to confirm CTCs harvested for analysis
- ❖ Secondary endpoints qRT-PCR, FISH, RNA-Seq
- ❖ **IRB approvals from MD Anderson and University of Rochester**
  - University of Southern California well advanced
- ❖ Discussions with 3 other major cancer centres to participate in patient enrolment
- ❖ **Studies expected to complete H2 CY18**

- ❖ CTCs harvested and RNA-Seq analysis successful for 100% of patients (21 patient study)
- ❖ **CTCs from Parsortix liquid biopsy had similar patterns of expression for 192 genes to the traditional biopsy of cancer cells from metastatic sites in all cases**
- ❖ **Wide range of metastatic sites**  
Skin, pleural effusion (fluid around the lung), pericardial effusion (fluid around the heart), breast, cerebrospinal fluid (fluid found in brain and spine) and bone tissue
- ❖ **CTCs provide information on 66 different pathways that may be targeted by new or existing cancer drugs**



**Julie E. Lang, MD, FACS, Director, USC Breast Cancer Program, Associate Professor of Surgery, Norris Comprehensive Cancer Center, University of Southern California**

"As a breast cancer surgeon, I am very enthusiastic about the potential of liquid biopsy ... Our pilot data shows that potentially the same information can be obtained from a simple blood test using Parsortix as from an invasive tissue biopsy and indeed may be advantageous over invasive tissue biopsies in regards to the diverse sites of metastatic disease ..."

- ❖ Barts Cancer Institute pilot studies
  - harvested CTCs in 100% of patients (52 patient study)
  - number of mesenchymal CTCs showed good correlation to Gleason score (80 patient study)
- ❖ **Simple blood test ahead of a standard tissue biopsy test** to reduce unnecessary tissue biopsies
  - **detect presence of prostate cancer**
  - **assess aggressiveness of disease**
  - patient risk stratification – differentiate between active surveillance (indolent) or intervention (aggressive)
- ❖ Blood cell discovery: cells identified as megakaryocytes linked to patient survival (40 patient study)
  - **option for worldwide exclusive licence over megakaryocyte IP**
- ❖ **New Parsortix CMS (combined EMTed CTC and megakaryocyte score) predicts overall survival: patients 10x more likely to die.** This may allow patients to receive stratified treatment



**Dr Yong-Jie Lu, Reader in Medical Oncology at Barts Cancer Institute**

“The exciting part of this research is the potential for the Parsortix system to be used to assess the severity of the disease as well as to detect it. This meets a key medical need to avoid over-treatment as well as to ensure treatment is available for patients who need it.”

## Co-marketing agreement with leading molecular testing company, QIAGEN

- ❖ QIAGEN leading molecular testing company
  - 500,000 customers and \$1.3bn revenues
  - NGS (next generation sequencing), PCR (polymerase chain reaction), single cell analysis products and bioinformatics capabilities
- ❖ Selected Parsortix after year long evaluation process identifying key benefits of Parsortix
  - 1) Epitope-independent: captures all relevant cells**
  - 2) Cells harvested intact and alive**
  - 3) Highly sensitive: works with almost all patients**
- ❖ Opportunity to extend co-marketing to cover Zplex platform
- ❖ Similar partnerships planned with other leading companies



### **Michael Kazinski, QIAGEN's Senior Director Molecular Preanalytic Technologies**

"ANGLE's Parsortix system is a unique, epitope-independent CTC solution offering easy, automated processing of whole blood to harvest all types of CTCs, including the clinically relevant mesenchymal CTCs, for analysis. It complements very well with our AdnaTest CTC portfolio, now allowing for both phenotypic and molecular characterization of CTCs. The modular combination abilities of this system with QIAGEN's liquid biopsy-based Sample to Insight offering, including AdnaTest, our targeted RNAseq and single cell solutions, along with our bioinformatics offering, will allow scientists and clinical researchers to significantly advance their research."

Liquid biopsy is coming ...

## Clear advantages of CTCs over ctDNA



- ❖ CTCs allow analysis of DNA, RNA and protein expression
  - ctDNA only allows analysis of DNA (not RNA and not protein)

ANGLE's ovarian application is based on RNA which cannot be measured by ctDNA

- ❖ CTCs can be analysed individually as single cells giving understanding of heterogeneity of disease
  - ctDNA exists in a contaminating background limiting analysis
  - vast majority of ctDNA comes from dead cells

ANGLE's prostate biopsy applications are based on the presence of mesenchymal CTCs and megakaryocytes that cannot be measured using ctDNA

- ❖ CTCs are whole cells, which provide cellular morphology, and full genetic information on the cancer
  - ctDNA is limited to some DNA information

ANGLE's metastatic breast cancer biopsy application is based on whole transcriptome analysis (RNA-Seq) of CTCs from blood giving the same information as a tissue biopsy. This cannot be measured using ctDNA

# Financial Highlights for the six months ended 31 October 2017



Six months ended 31 October	2017	2016
Statement of Comprehensive Income	£'000	£'000
Revenue	188	219
Cost of sales	(54)	(43)
Gross profit	134	176
Operating costs	(4,245)	(3,088)
Other income	1	20
Loss before tax from continuing operations	(4,110)	(2,892)
Statement of Financial Position	31Oct17	30Apr17
Trade and other receivables and R&D tax credit	2,918	1,975
Inventories	854	665
Cash	4,281	5,536
Property, plant and equipment	849	824
Intangible assets	2,160	1,918
Total assets	11,062	10,918

## Comments

- ◆ Research use sales established
  - >145 Parsortix instruments in active use
  - >39,000 blood separations have already been performed on the Parsortix system
- ◆ >70% gross margin
- ◆ Planned expenditure on clinical studies
- ◆ Cash position strengthened with £15m fundraise with majority of proceeds received post period end
- ◆ Leading institutional investors
  - Jupiter 14%
  - Legal & General 7%
  - Fidelity 6%
- ◆ Seeking a leading position in \$ multi-billion emerging market

## Growing body of published evidence: recent breakthrough results

- ❖ 10 publications (30 April 2017: 4) and 19 posters (30 April 2017: 13)
- ❖ Barts Cancer Institute **megakaryocytes**: Parsortix CMS identifies patients 10x more likely to die
- ❖ University of Maryland **micro-tentacles** allows testing of drugs on living CTCs outside the patient
- ❖ University of Southern California **comparable gene expression** from blood as biopsy of metastatic site
- ❖ Heinrich Heine University Duesseldorf **cultured CTCs** to provide long term proliferation of cells
- ❖ Center for Women's Health Tuebingen **harvested DTCs** responsible for relapse from bone marrow
- ❖ University of Hamburg, Medical University of Graz and Stockholm University detected **ARV7 transcripts** in prostate cancer linked to absence of response to Enzalutamide and Abiraterone
- ❖ Western University, Canada utilises Parsortix small volume adaptor in **mouse models**

# Parsortix™ patented system developing a world-leading position in emerging \$ multi-billion liquid biopsy market



- ❖ Providing the **Complete Picture** (viable, intact CTCs for DNA, RNA, and protein analysis not just ctDNA)
  - Widespread adoption by leading cancer centres in Europe and the United States
- ❖ FDA study to support platform clearance for metastatic breast cancer with results expected H2 CY 2018
- ❖ Ovarian cancer application successfully completed 400 patient studies and in optimisation
- ❖ Co-marketing agreement with QIAGEN
- ❖ Acquisition provides unique potential for CTC sample to answer in liquid biopsy





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