Phalanx Biotech Group

Company Brief

Oct, 2017

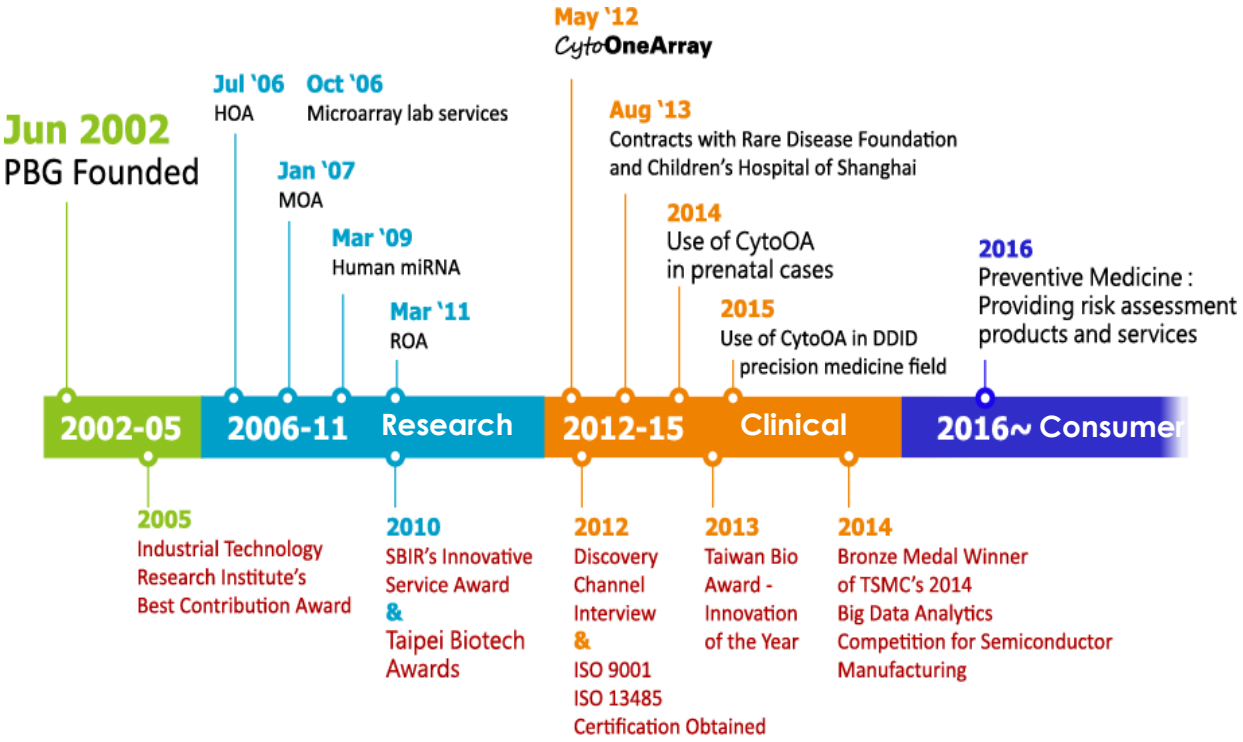
Phalanx Biotech Group

INNOVATION, QUALUTY, SERVICE

Phalanx is the Global F4 and Asian's Only High Density Biochip Company

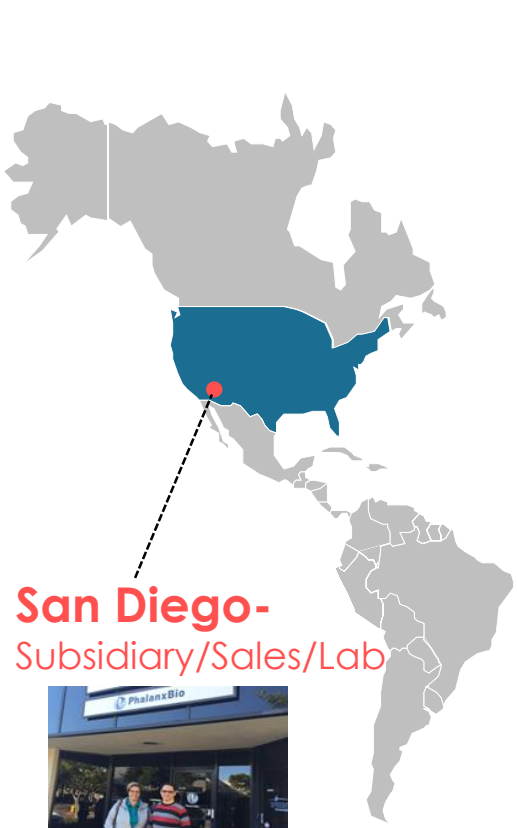
- **ONLY** commercially operated high density biochip technology platform originated in Asia (Taiwan)
- **FIRST** technology transferred genetic firm from ITRI Taiwan, the largest government support industrial technology research institute (June, 2002)
- **DIVERSIFIED** genetic platform providing products and services for clinical, consumer and research clients

Phalanx Milestones



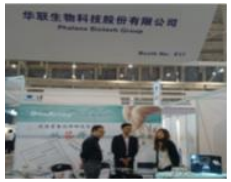
Our OneArray platform has been in over 370 publications in major journals!

Phalanx's Global Layout

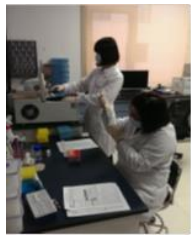


San Diego-
Subsidiary/Sales/Lab

Great Shanghai
Subsidiary/Sales/Lab



Beijing-
Sales/Lab



Hsinchu Science Park-
Headquarter

Phalanx Production Line and Laboratory Meet Clinical Regulation

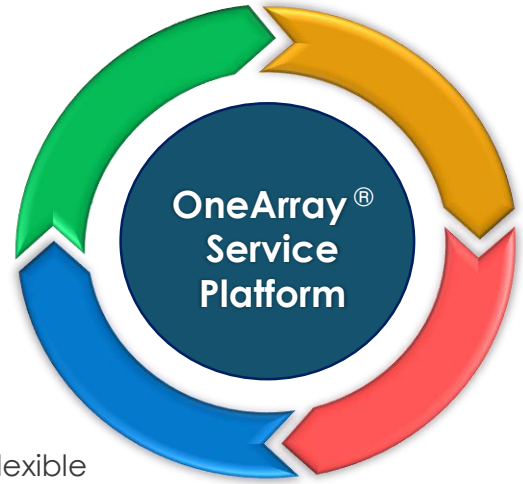
- **71** domestic and international **patents**
  - Micro-liter-scale liquid transferring
  - Highly-precise thermal bubble printing
  - Printing head manufacturing
- Daily manufacturing speed up to **3,000** arrays with **whole genome** detection capability
- **ISO9001, ISO13485, ISO17025, CE** certified
- GMP, ISO 15189 (expect in 2018)




Phalanx Provides One-Stop Genetic Shopping

Standard Products
Design & Manufacturer

- **Strict QC Guidelines:** ISO certified
- **Speedy production:** non-contact, rapid distribution technology



Laboratory Services
Genetic testing

- **One-stop service:** From sample preparation, experiment, to data analysis
- **Convenient and quick:** Flexibility on sample size

Customizations
Probe design & Reagents development

- **Customized arrays:** multiple substrates, flexible formats, probe design and production
- **Reagents:** design, development, manufacturing
- **Customized testing services**: Array, qPCR, NGS…)
- **Other gene detection platforms**

Bioinformatics
Multiplatform & Cloud-based

- **Microarray/NGS Data Analysis:** Affymetrix , Illumina, Agilent
- **CytoCloud, a Cloud computing platform:** quick and easy analysis report output

Phalanx Offers High Throughput and Cost Efficient Turnkey Solution

Nucleic Acid Extractor

Designed for CytoOneArray & SNP product lines (2016 H2)

Nucleic Acid Amplification System

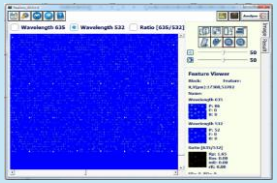
Designed for CytoOneArray & SNP product lines (2017 H2)

Array Cleaner

Designed for all Phalanx array product lines (2018 Q3)

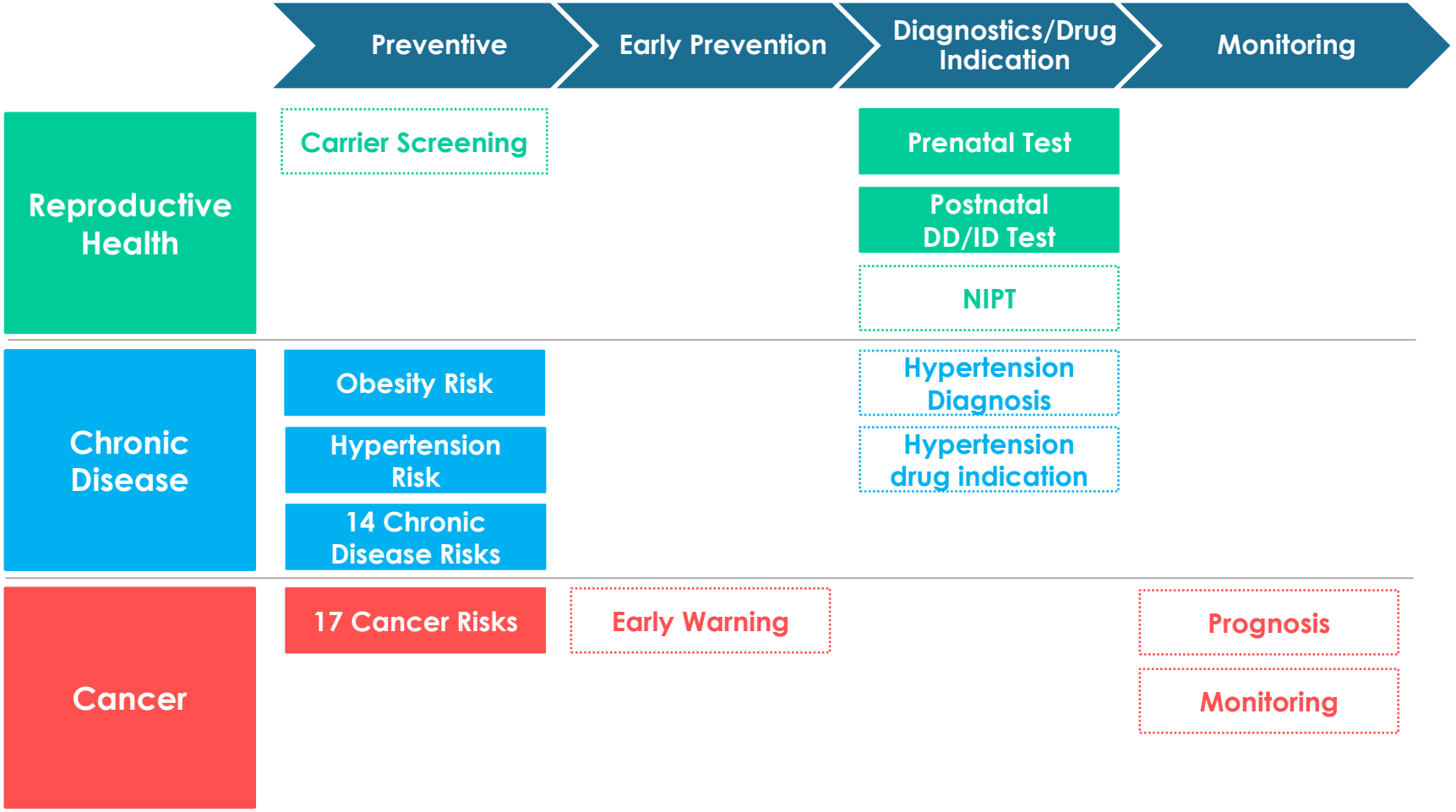
Array Scanning

Universal disk-based array scanner (2017 Q4)



Data extraction software designed for all Phalanx array product lines (2018 Q1)

Phalanx Product Pipeline



Phalanx's Main Products for Clinic *Cyto*OneArray

- **Kit with the shortest hands-on-time**
- Detection of **chromosomal variations (CNV, Copy Number Variation)** in fetuses, children, and adults
- Simultaneous detection of **>350 disease regions on all 23 pairs of** chromosomes, with a focus on **DD/ID-related** diseases

【Specifications】

Database	UCSC hg19
Probe Length	57-63 mer
Disease Regions	371
Probe Resolution	10 - 30 Kb
Total Probes	33,255
Specimens	Blood (children), amniotic fluid

CytoOneArray is a Broad Usage Product

Genetic Carrier for diseases

Newborn screening

Prior to marriage or pregnancy → **Prenatal** → **Preschool**

Clinical Testing

CytoOneArray®

- ✓ Pregnant women over 34 years old
- ✓ Ultrasound abnormalities
- ✓ High risk for Down's syndrome

Taiwan

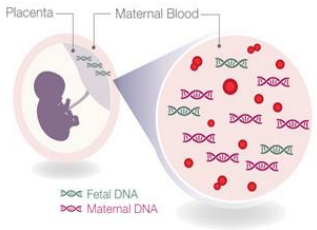
CytoOneArray®

- ✓ Developmental Delays
- ✓ Intellectual Disorders
- ✓ Autism

Taiwan & China

Phalanx Is Developing Next Generation Non Invasive Prenatal Test Technologies

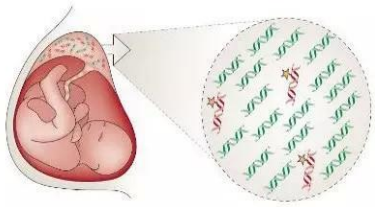
G1:Counting
(DNA amount)



- ✓ Sequenom (MateriT21)
- ✓ Illumina (Verinata Verifi)
- ✓ Berrygenomics
- ✓ BGI (NIFTY)
- ✓ Ariosa (Harmony)

97% market share. Could be replaced within 3-5 years due to high false positive rate (PPV=10-50%) and low disease detection items (10-20).

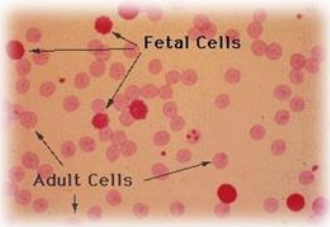
G2:Differentation
(SNP or Methylation)



- ✓ Natera (Panorama)
- ✓ Ariosa (Harmony)
- ✓ LifeCodexx (Prena)
- ✓ **Phalanx**

3% market share. False positive rate significantly improved over G1 but will not become ultimate solution due to limited disease detection items (low tens).

G3:Purification
(Cell-base)



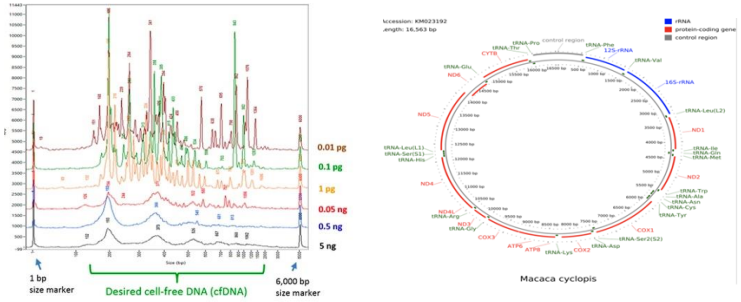
- ✓ RareCyte, USA (research)
- ✓ **Phalanx**

Still in research. Will become ultimate product because of superior accuracy and whole genome detection capability

Phalanx G2 NIPT, SNP-array-based

99% accuracy at 2.5 % fetal fraction detection limit

Collaborative project with TOP-PCR platform from Academia Sinica. 1pg cfDNA needed only.



Spec: 99% accuracy at 2.5 % fetal fraction for

(1) Down syndrome, trisomy 21

(2) Edward syndorme, trisomy 18

(3) Patau syndrome, trisomy 13

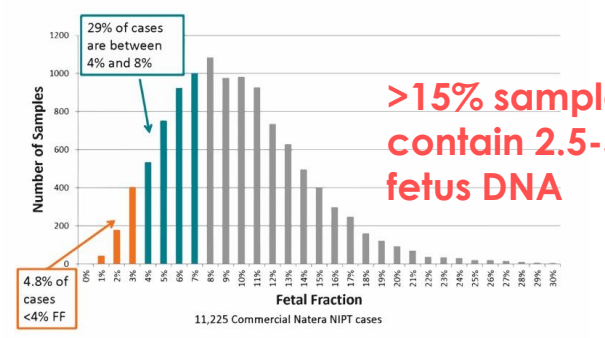
(4) Turner syndrome, monosomy X

(5) Klinefelter syndrome, XXY

(6) XXX

(7) XYY

Why we aim at 2.5%, not 5% ?

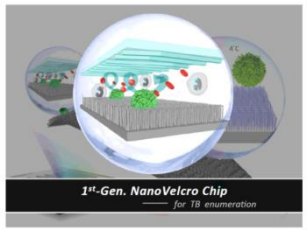


>15% samples contain 2.5-5% fetus DNA

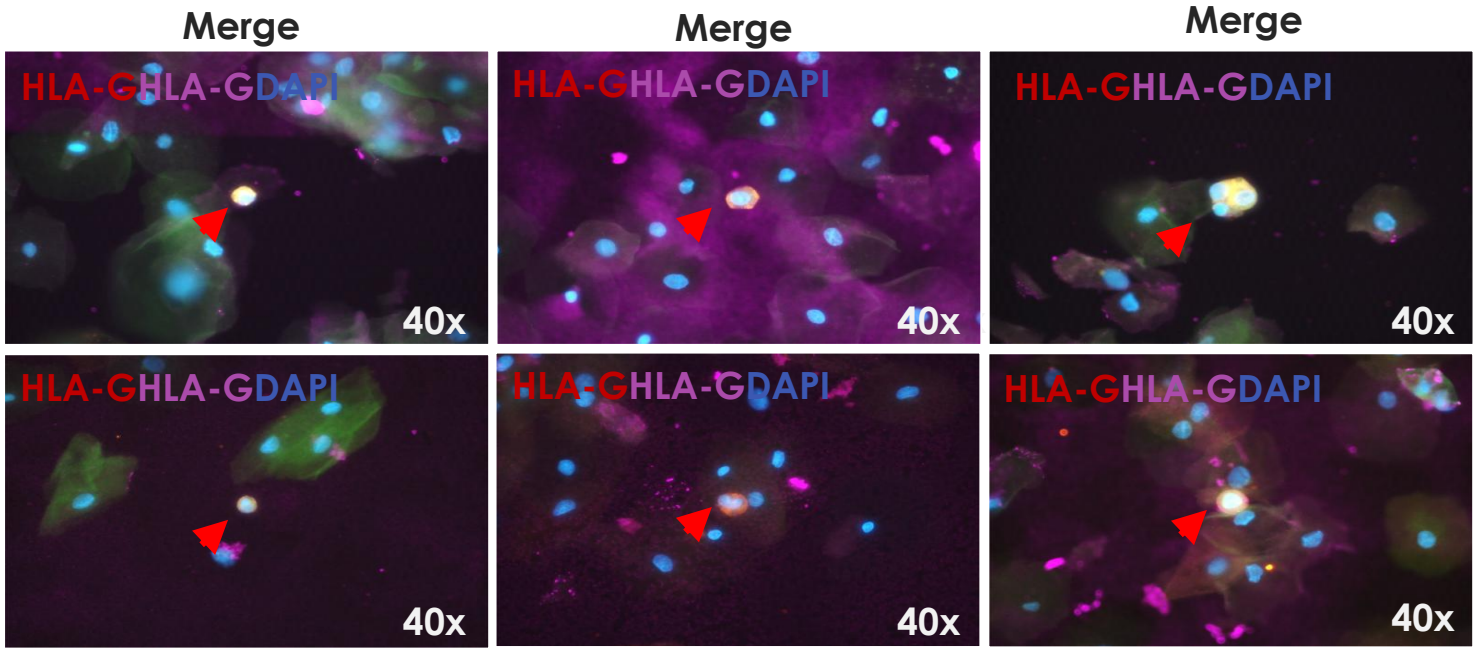
Phalanx G3 NIPT, cell-based WG diagnosis

Capable of capturing few hundreds fetal cells

Collaborative project with UCLA NanoVelcro technology



✓ Fetal cell captured: **300-800**



The End