New Medical Paradigms

Dr. Trevor Hawkins
Chief scientist
Pandora’s box has been opened…

A movie is playing at this moment

GATACA. Universal Pictures 1994
Molecular Healthcare was kicked off in 2000 but will be played out over the next 50 years

**Molecular Diagnostics**

The development and commercialization of clinical diagnostic *in-vitro* assays based upon the patients DNA, proteins or other biomarkers. Tests are carried out usually on blood, serum, bodily fluids at a central lab and results returned to the physician.

**Molecular Imaging**

The development and commercialization of clinical *in-vivo* assays based upon the patients DNA, proteins or other biomarkers. Tests are carried out in the hospital using various diagnostic imaging systems – PET > SPECT > MR > ULTRASOUND > OPTICAL.
Taking Molecular Healthcare to the patient

Only Philips

Molecular Diagnostics & Molecular Imaging are all about the patient

Your Biomarkers

It will break down the walls of the hospital

Introduce environment and continual awareness as a vital health tool

Combine simplicity, practicality and become as accepted as daily consumer electronics
Focus on the Care Cycle – Molecular Healthcare

- Patient Stratification for Personalized Treatment
- Therapy Monitoring
- Monitoring for Relapse
- Management of Chronic Disease
- Predisposition Testing & Screening
- Early Diagnosis
- Rapid Results
- Diagnostics
- Follow Up
- Treatment
Vision on Health(care): Paradigm Shifts

From imaging to targeted diagnostic imaging

- expansion into other parts of the care cycle
  - from imaging & patient monitoring to therapy support, guidance, drug delivery solutions, implantables

From organ to cell and molecule

- early detection and personalized treatment
  - from morphology and treatment at organ level to unraveling biological functions and disease pathways at the molecular biology level

From hospital centric to patient centric

- solving the healthcare system crisis through empowered consumers
  - enabling prevention, home care, self care, remote patient management
Molecular Healthcare
The Philips approach will draw on strengths & brand

<table>
<thead>
<tr>
<th>Align with the patient, payor &amp; physician</th>
<th>Create a technology pipeline</th>
<th>Partner &amp; fill gaps</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Drive the market change from screening to patient care</td>
<td>• Combine the Philips platform approaches into clear strategy</td>
<td>• MDx adoption will be driven by link to a drug</td>
</tr>
<tr>
<td>• Reimbursement, validation &amp; education will drive uptake</td>
<td>• Drive patient centric care approaches</td>
<td>• Drive the adoption through alliances with big pharma</td>
</tr>
</tbody>
</table>

*Marketing & customer education will be as important if not more than the technology itself*
Our Strengths in Molecular Diagnostics

OPTICAL DETECTION
- Low cost (DVD technology)
- Small size
- High sensitivity – single molecule detection!

MAGNETIC BIOSENSOR
- Low cost (magnetic read head technology)
- Integrated Biosensor with small size
- Rapid measurements possible

MINIATURIZATION & INTEGRATION
- Electronics on glass or plastic
- Fluidics without moving mechanical parts
- Enables fully integrated cartridges: near patient testing
Molecular Diagnostics
Bringing the test to the patient

- Tie into existing Philips leadership positions
  - Patient monitoring – Infectious disease
  - Cardiovascular disease
  - Oncology
Our Strengths in Molecular Imaging

SCHERING ALLIANCE

- Optical Mammography project
- Framework for additional programs
- Leverages the strengths of both entities

GEMINI TIME OF FLIGHT PET

- Increased throughput
- Increased sensitivity
- Pipeline improvements

CONTRAST AGENT DEVELOPMENT

- Molecular targeted micro bubbles for U/S
- Targeted SPECT & PET Agents
- Molecular targeted Magnetic particle imaging
For years, time-of-flight PET imaging has tantalized and eluded research teams.
Gemini TF – Time of Flight Technology

Data courtesy of J. Karp, University of Pennsylvania
VISION: PET CENTER OF THE FUTURE

PET/CT and SPECT CT as central diagnostic tool to guide the care cycle in oncology:

- **Diagnosis**:
  - Improved sensitivity
  - Improved specificity
  - Metasesis

- **Staging**:
  - Aggressiveness
  - Metabolic activity

- **Therapy**:
  - Radio resistance
  - Accurate Delineation
  - Radio Immunotherapy

- **Follow-up**:
  - Apoptosis
  - Proliferation
  - Metabolism verus Inflammation
Innovation – Completing the Care Cycle

**Molecular Diagnostics**
From lab based tests to patient centric care in the community & the hospital

**Molecular Imaging**
From diagnostic imaging to targeted molecular diagnostics and therapy