



## Avian Influenza Monitoring and Characterization

Dr. Marco Gut, DVM

During our conversations with public health laboratory directors, we've heard...

We need **standardized systems and protocols** that yield **repeatable and reliable results**.

We need **high quality reagent materials** for routine and outbreak scenarios.

We need **highly responsive service and support** to maintain **operational readiness**.

We need to remain **flexible** in order to respond to new threats to public health.

## End-to-End Infectious Disease Identification: Comprehensive Monitoring of Avian Influenza

**Get the target**      MagMax™ Nucleic Acid Isolation Kits

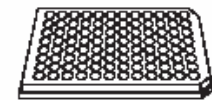
**Analyze it**      Applied Biosystems Real-time PCR  
Systems and  
TaqMan® Detection Kits & Reagents

**Characterize it**      NA-Star™ NI Resistance Kit

**Sequence it**      Applied Biosystems Genetic Analyzers  
and FluSEQr® Resequencing System

# Efficient RNA Extraction using MagMAX™-96 Viral RNA Isolation Kits

- Biofluid samples such as serum, plasma, nasal fluid, milk, and swab samples
- High yield – more RNA/DNA from less sample
- Ease-of-use
- Flexible throughput
- Simple automation

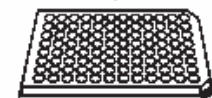


### Biofluid Samples

1. Add Lysis/Binding Solution with Carrier RNA
2. Add bead mix
3. Shake for 5 min



4. Capture and wash beads 4 times
5. Elute viral RNA



### Viral RNA

Applied Biosystems 7300 / 7500 / 7500 Fast / 7900HT  
Real-time PCR Systems



# Global Influenza Surveillance



- 80'0000 Tests delivered to 30+ countries
- Proven to detect current isolates of interest
- Partnered with 10 leading infectious disease research labs
- New version to be released in early 2007: modular portfolio for A, H5, H7, N1 in lyophilized format

\*Not available for sale in the United States  
For Research Use Only. Not for use in diagnostic procedures.

## Global Influenza Research

### NA-Star™ Kits for Resistance Detection



- Detects Resistance to Neuraminidase Inhibitors
- Superior Sensitivity
- Evaluated by US CDC, UK HPA and WHO labs for research on influenza isolates
- Enables effective development and deployment of therapeutics

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# Influenza Strain Sequencing FluSEQr™ Resequencing System



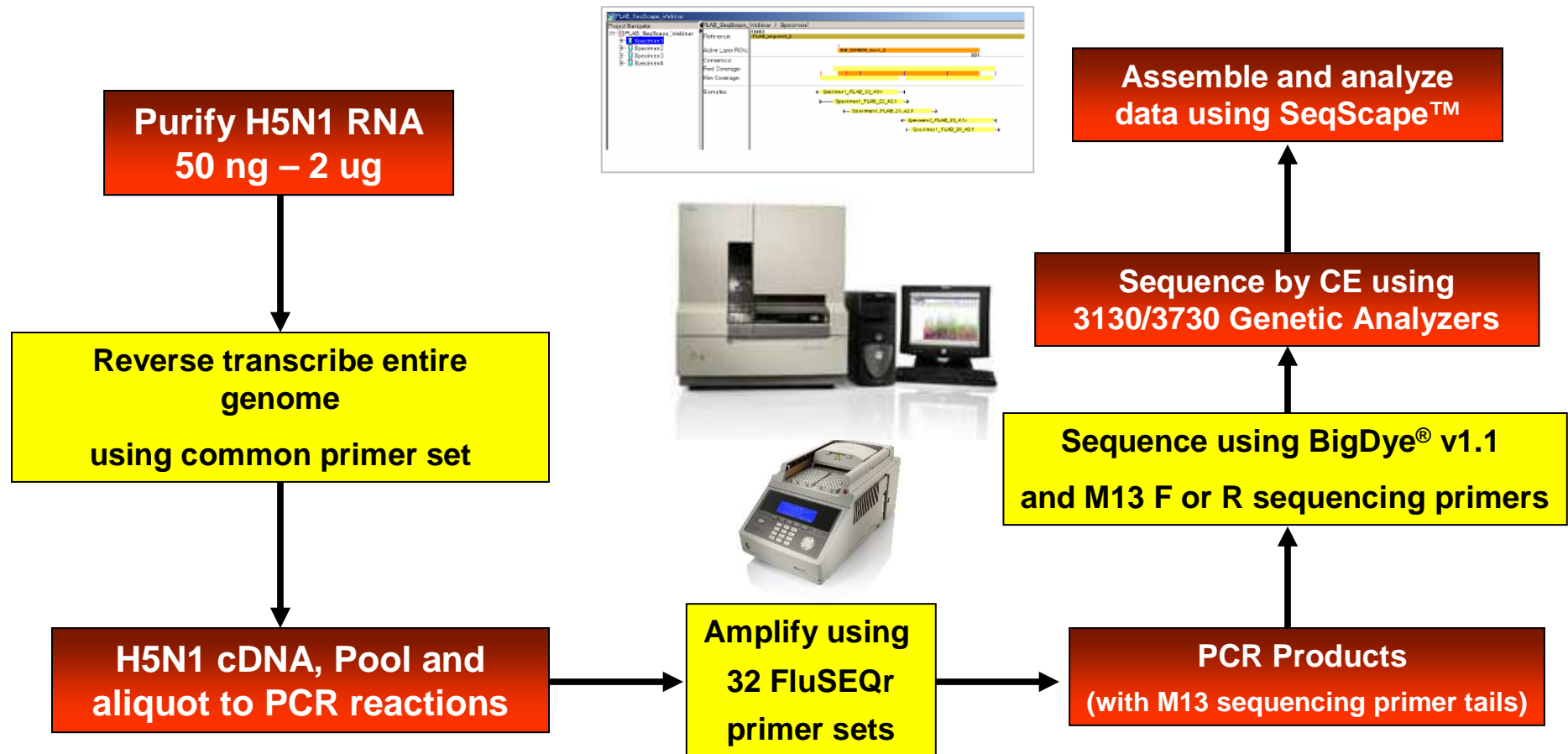
- Coverage 2X – Enable high Throughput
- H5N1 NCBI submissions 2003 - 2006
- Ease of Use – 32 PCR reactions
- 64 sequencing reactions using 2 Universal primers
- Automated assembly in SeqScape™ Software

# FluSEQr™ Resequencing System Progress



- Leveraged Celera Genomics bioinformatics system to develop a primer set for H5N1
- Collaborating with:
  - WHO in Melbourne
  - Los Alamos/UCLA
  - Hong Kong University
  - Testing of primer designs in progress
- Launch – Early 2007

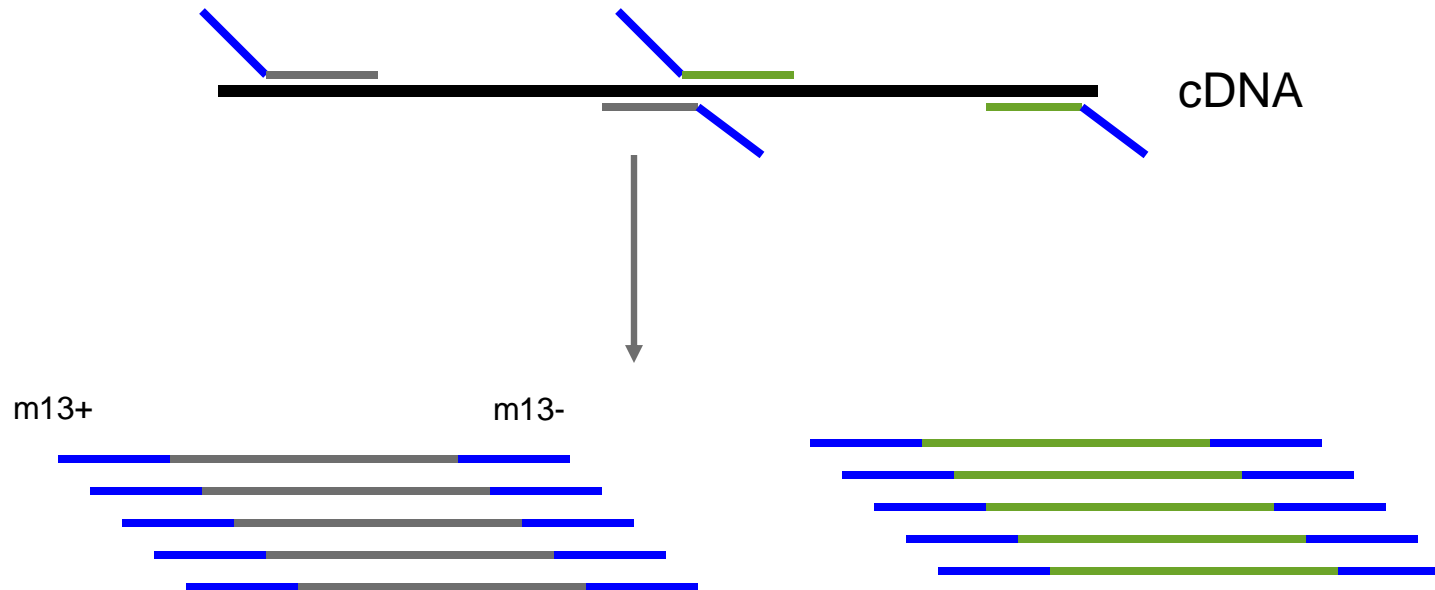
# FluSEQr™ Workflow



## FluSEQr Resequencing System (H5N1)

<b>Segment</b>	<b>Length (nt)</b>	<b>PCR Primer Sets</b>
PB1	2341	5
PB2	2341	5
PA	2233	6
HA	1778	5
NP	1565	4
NA	1413	4
MP	1027	2
NS	890	2

# Amplify using FluSEQr™ Primer Sets

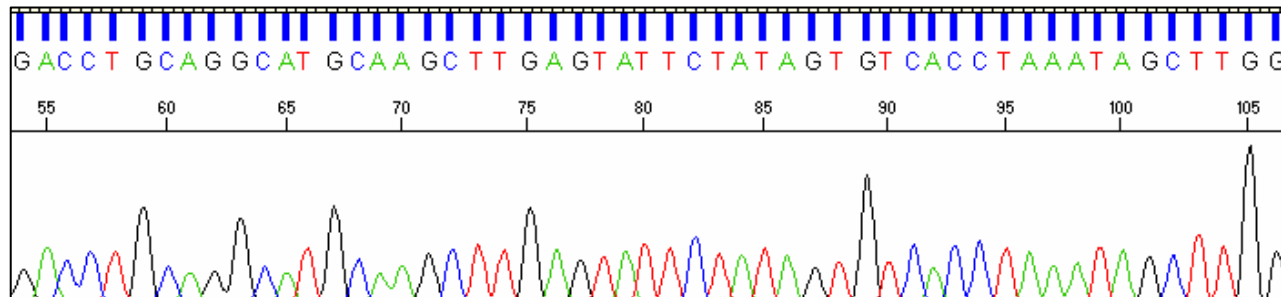


# BigDye® Terminator Sequencing Using Universal m13 Primer Set

Universal m13 +  
sequencing primer

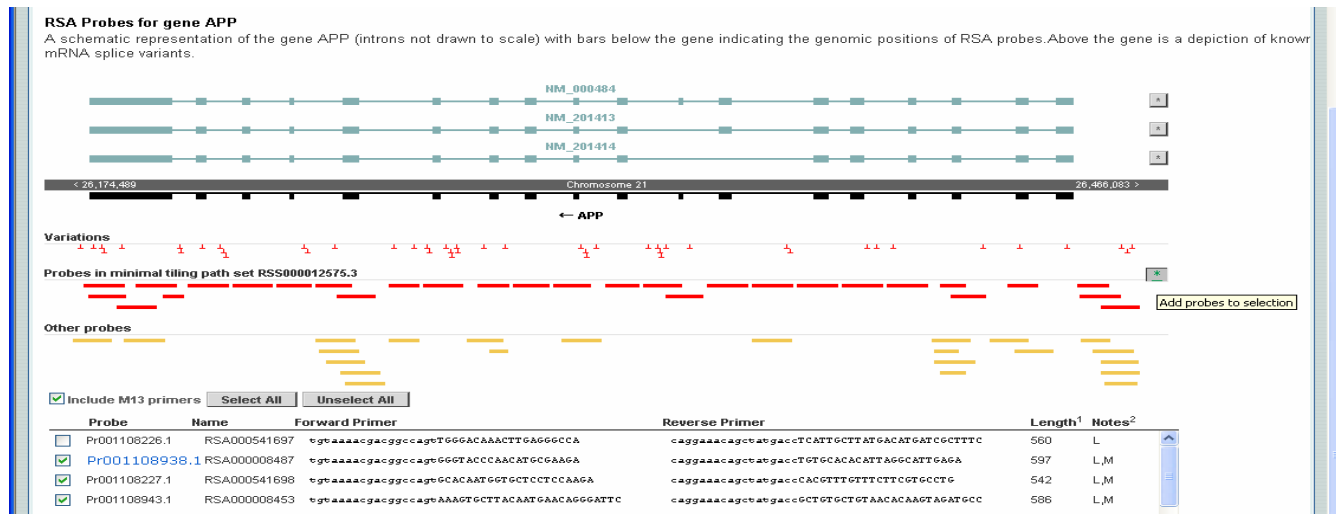


PCR Product

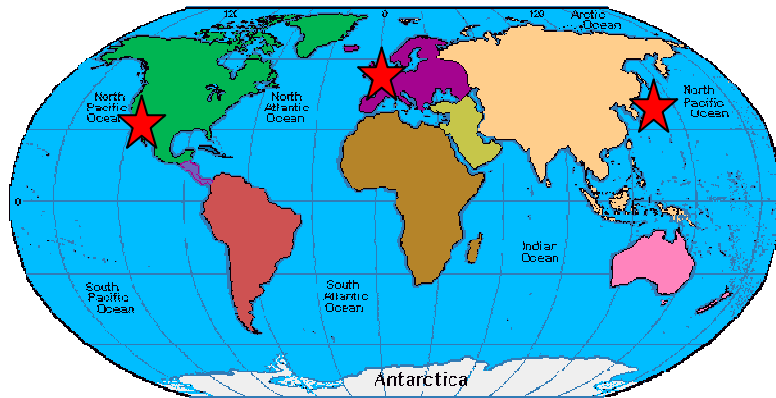


# YouSEQr™ Resequencing System Custom Design Tool

- H5N1 genome will be available through portal – early 2007
- Graphical display of FluSEQr primer sets
- Custom FluSEQr primer design tool
- Graphic interface for result display and primer selections



**“We need guaranteed supply chain together with highly responsive service and support to maintain operational readiness.”**



- Global Manufacturing Locations and Operation
- Reagents for 2.5 Million assays delivered to date
- Over 1.5 Million tests run with no false positives
- Extensive Field Service and Support Teams

### Pathogen Characterization Systems (Nucleic Acid Sequencing)



NA Star™ Detection Kits



### Mass Spectrometry Systems



### Pathogen Detection Systems (Real-Time PCR)



## Use of Applied Biosystems Products

Applied Biosystems products are for research use only. Not for use in diagnostic procedures.

Avian flu nucleic acid based pathogen detection products, and certain other contagious disease detection products, are currently not for sale or use in the US for health epidemiology purposes. US purchase of such products requires special research use only certification. Contact Applied Biosystems for details.

No Applied Biosystems products are approved by US FDA or under the European IVD directive, or any other regulatory agency, for diagnostic or other clinical use.

Purchase of the TaqMan® Influenza A/H5 Detection Kit Version 1.0 includes an immunity from suit under patents specified in the product insert to use only the amount purchased solely in environmental testing applications, including epidemiological studies, and also for the purchaser's own internal research. No other patent rights are conveyed expressly, by implication, or by estoppel. For further information contact the Director of Licensing, Applied Biosystems, 850 Lincoln Centre Drive, Foster City, California 94404, USA.

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## Comprehensive Tools for Avian Influenza Monitoring and Characterization

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