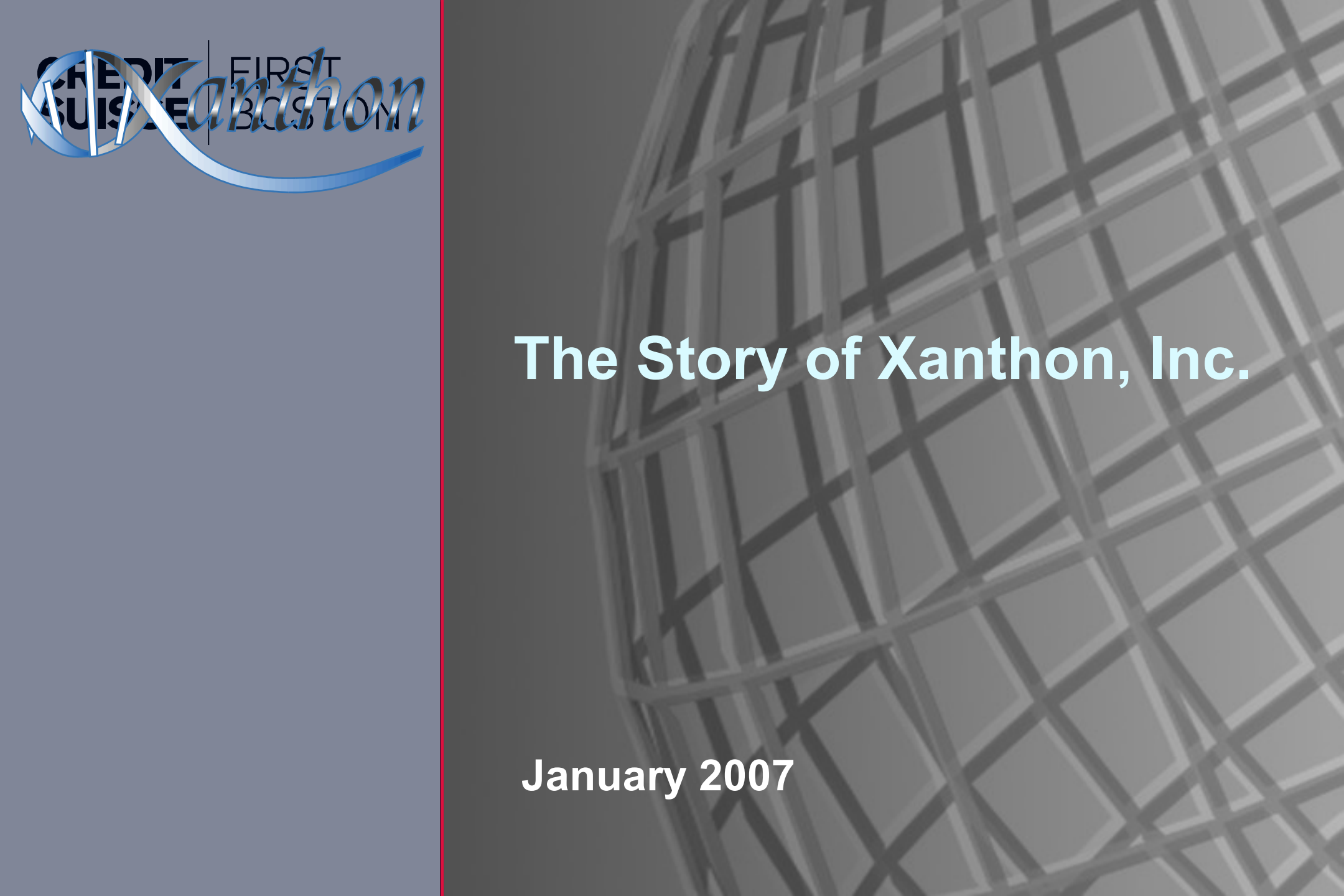


The Story of Xanthon, Inc.

January 2007

Scientific Entrepreneurship: Why do we do it?

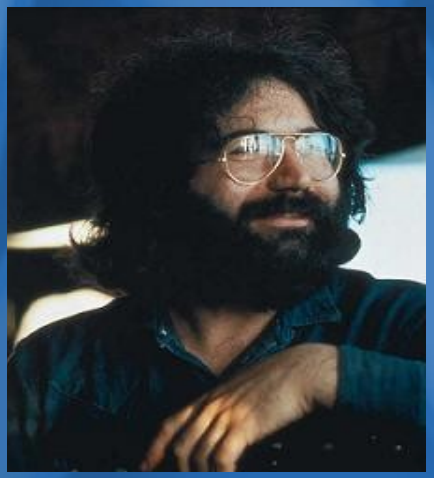
- Individual grants from the federal government provide support for graduate students and postdoctoral associates, but not…
- More senior personnel with industrial experience
- Product development
- Clinical trials
- Big equipment
- Heavy patent filing and prosecution

Government agencies are now LOOKING for spinouts from federal research.

Words of Wisdom

"You do not merely want to be considered just the best of the best. You want to be considered the only ones who do what you do."

Jerry Garcia



History of Xanthon

Founded on UNC technology in 1996

Over $30M raised from regional investor group: Intersouth Partners (RTP), Franklin Street Partners (RTP), Aurora Funds (RTP), Noro-Moseley Partners (Atlanta)

Company grew to as many as 62 employees

Facts About the Human Genome

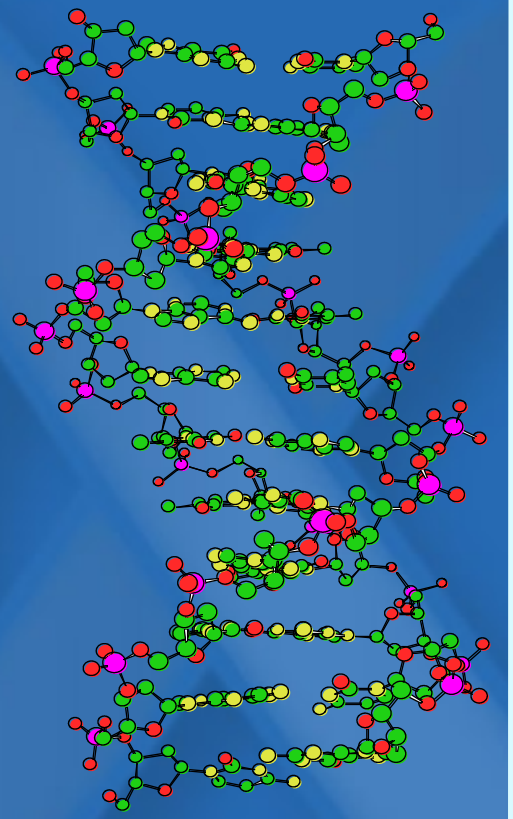
Over 3 billion nucleotides long

Contains 30,000 genes

All cells have the same genome

What makes cells different is which genes are “expressed”

The amount of mRNA present indicates the expression of a gene



DNA → RNA → protein

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Genomics Business Models

Gene sequencing – Celera

Gene sequencing tools – Applied Biosystems

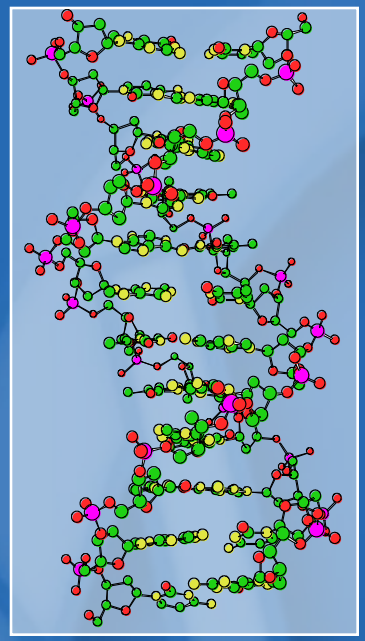
High-content, low-throughput gene expression tools – Affymetrix, Rosetta

Probe diagnostics – GenProbe, Myriad Genetics

Low-content, high-throughput gene expression - unserved

Genes and Gene Expression

A=T
G=C

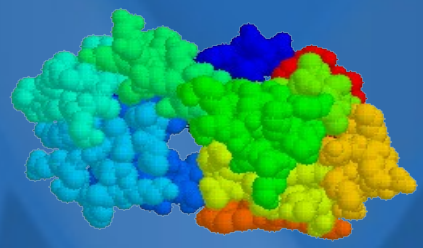


DNA

A=U
G=C

mRNA

codons



Protein

Rough draft of Human Genome Project complete

Different genes are “turned on” in different cells. Humans have ~20,000 genes.

Design inhibitors for therapy

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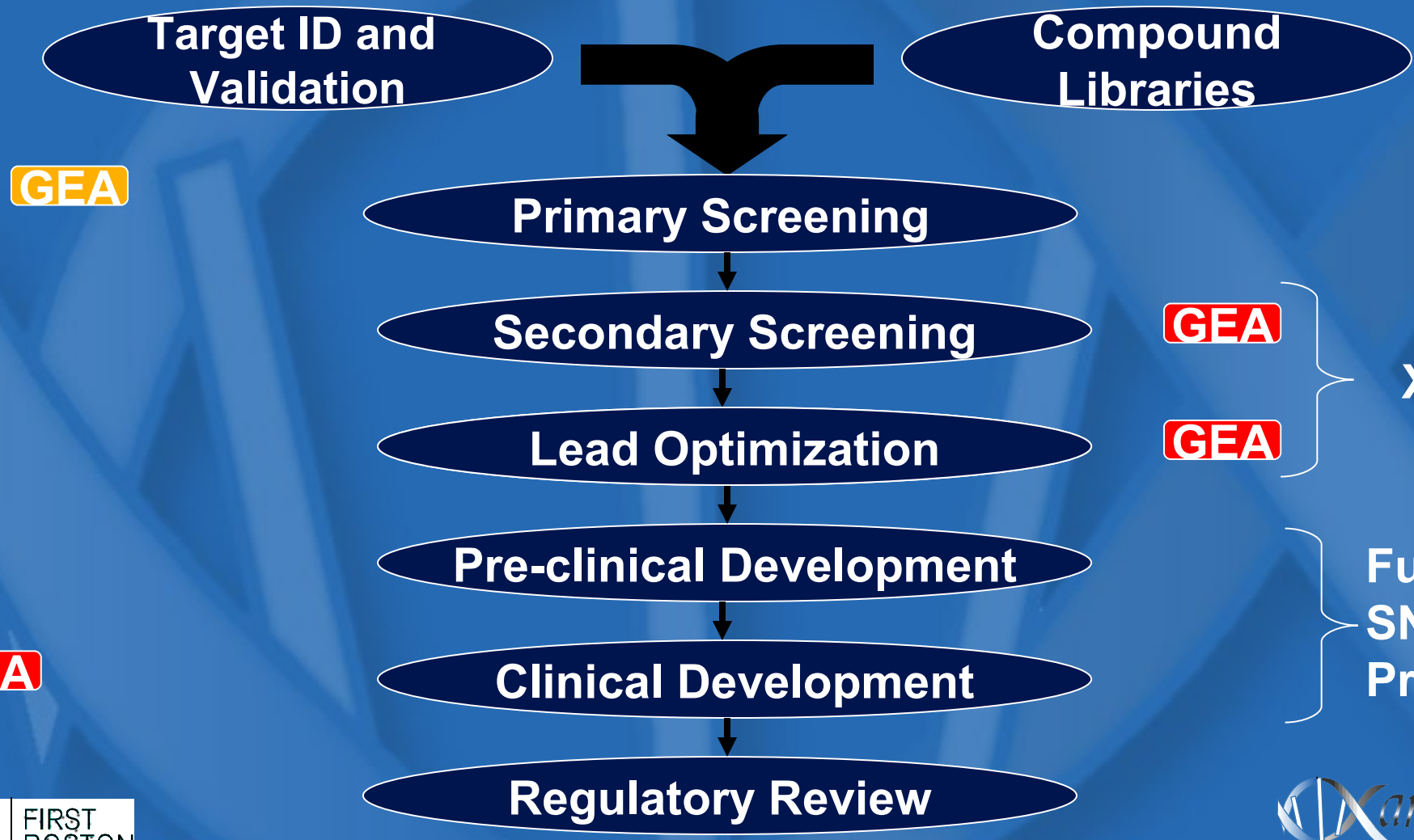
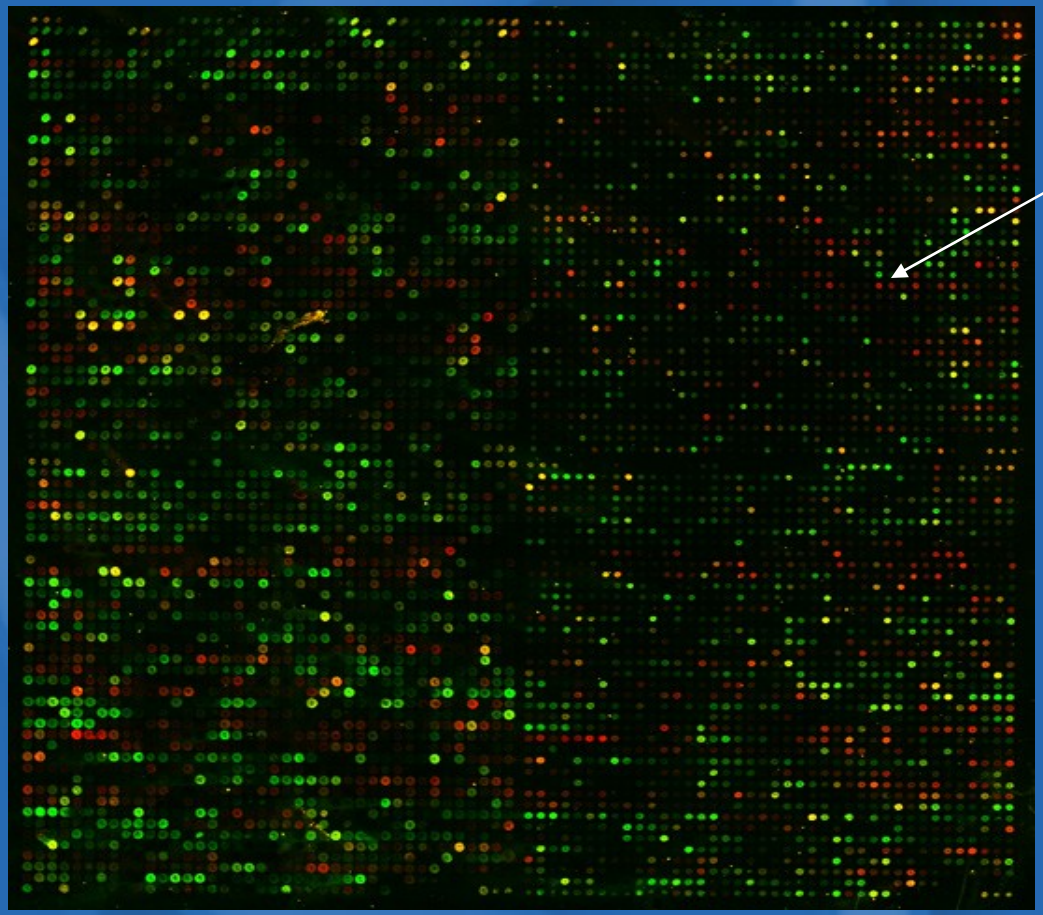
Drug Discovery & Development



Expression Analysis

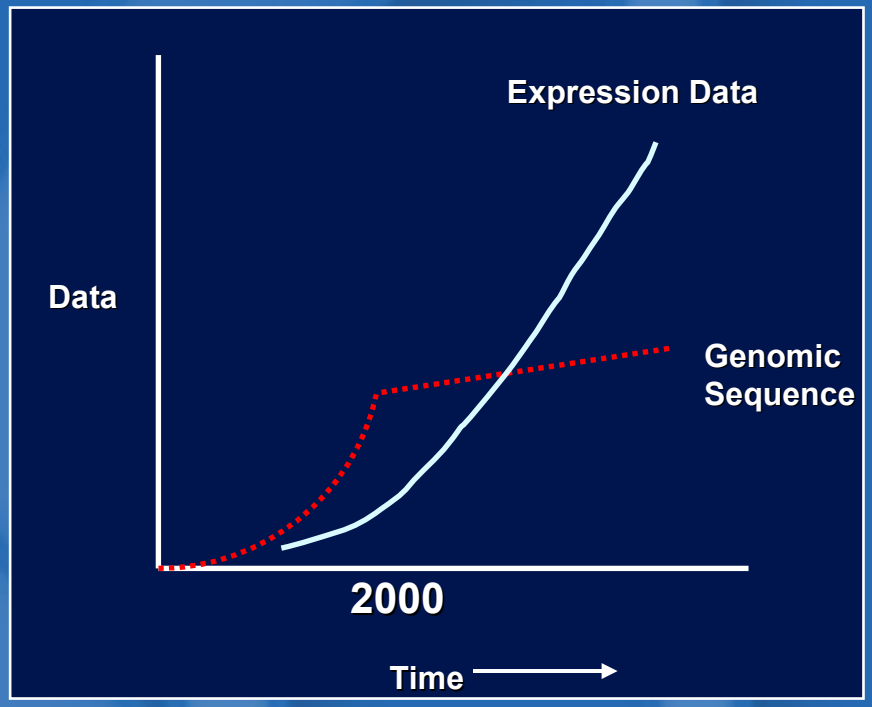


Individual mRNA sensing sites

Fluorescent tags attached to mRNA with imaging by microscope

DNA → **mRNA** → protein

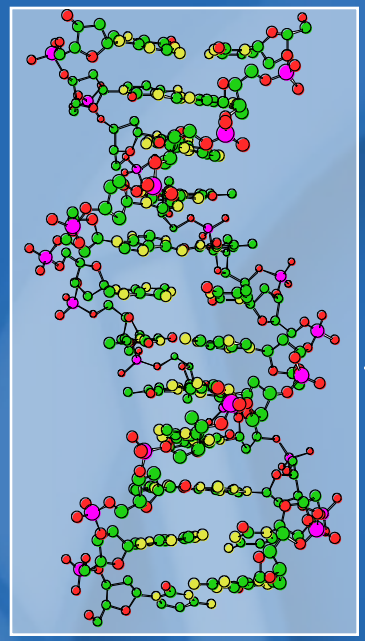
Predicted Growth of Expression Analysis

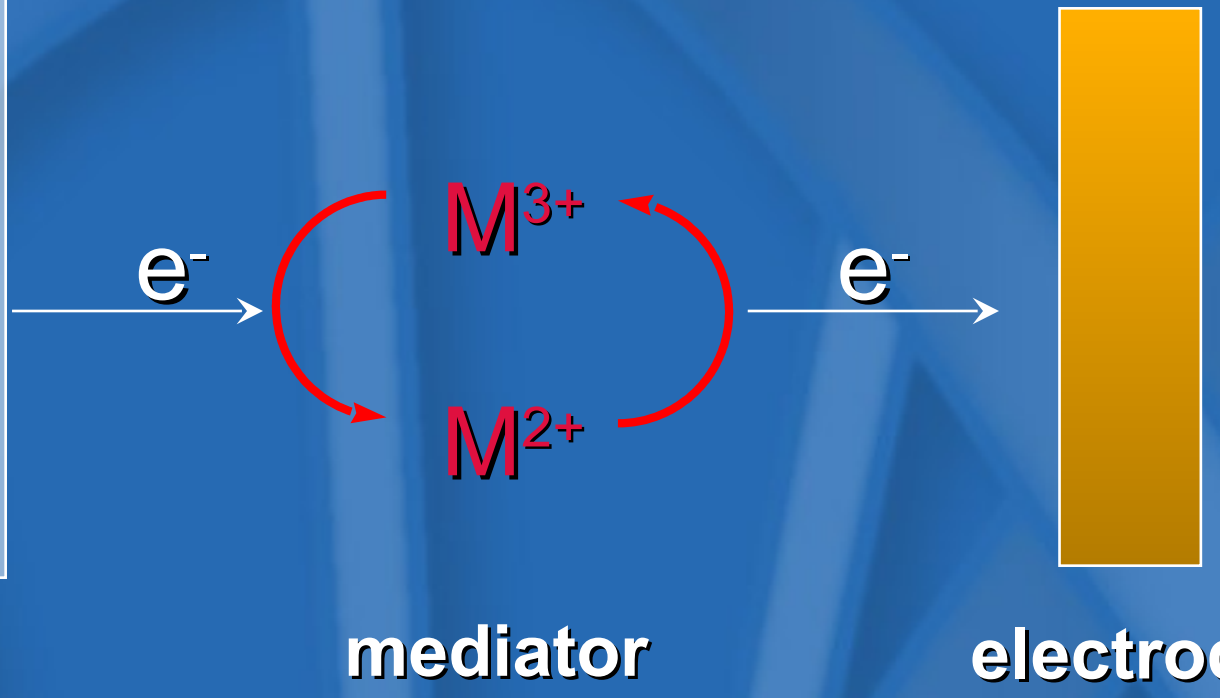


"If this were a marathon, we would just be lacing up our shoes. For now the really hard work begins: discovering the function of genes and how they relate to each other."
Henri Termeer, CEO, Genzyme, September 2000

Source: Drug Discovery World Summer 2000

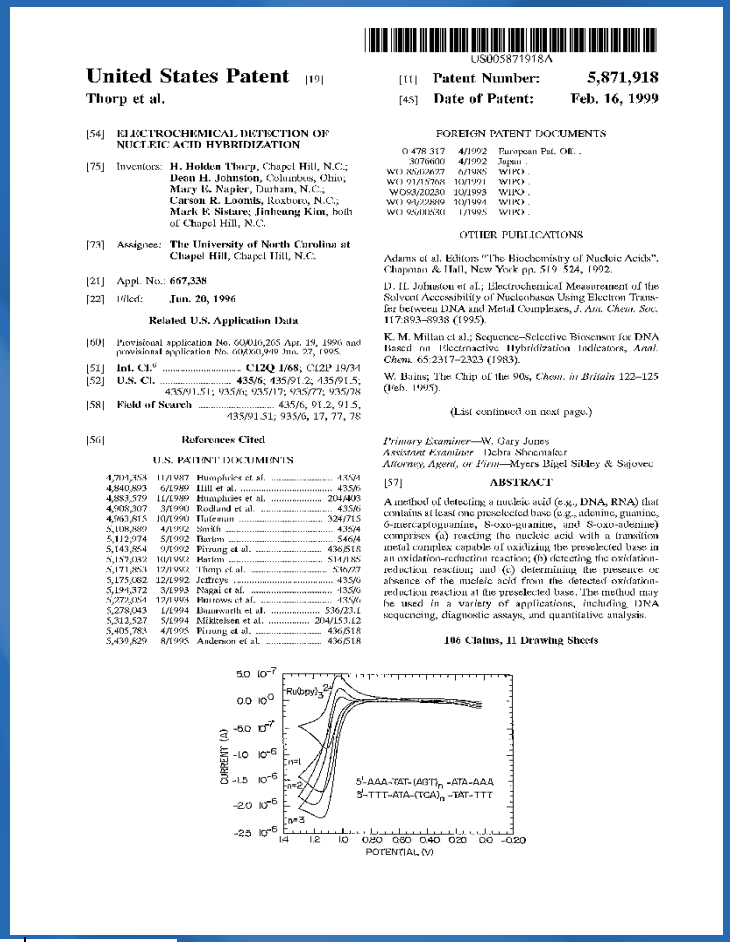
DNA and Electrodes





- Mediator transfers electrons efficiently
- DNA can be immobilized for maximum specificity and hybridization

Intellectual Property



US005871918A

United States Patent [19]
Thorp et al.

[11] **Patent Number: 5,871,918**
[45] **Date of Patent: Feb. 16, 1999**

[54] **ELECTROCHEMICAL DETECTION OF NUCLEIC ACID HYBRIDIZATION**

[75] Inventors: **H. Holden Thorp**, Chapel Hill, N.C.; **Dean H. Johnston**, Columbus, Ohio; **Mary K. Napier**, Durham, N.C.; **Carson R. Loomis**, Roxboro, N.C.; **Mark F. Sistare**; **Jinheung Kim**, both of Chapel Hill, N.C.

[73] Assignee: **The University of North Carolina at Chapel Hill**, Chapel Hill, N.C.

[21] Appl. No.: **667,338**

[22] Filed: **Jun. 20, 1996**

Related U.S. Application Data

[60] Provisional application No. 60/016,265 Apr. 19, 1996 and provisional application No. 60/000,949 Jun. 27, 1995.

[51] **Int. Cl.**[6] **C12Q 1/68**; C12P 19/34

[52] **U.S. Cl.** **435/6**; 435/91.2; 435/91.5; 435/91.51; 935/6; 935/17; 935/77; 935/78

[58] **Field of Search** 435/6, 91.2, 91.5, 435/91.51; 935/6, 17, 77, 78

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(List continued on next page.)

Primary Examiner—W. Gary Jones
Assistant Examiner—Debra Shoemaker
Attorney, Agent, or Firm—Myers Bigel Sibley & Sajovec

[57] **ABSTRACT**

A method of detecting a nucleic acid (e.g., DNA, RNA) that contains at least one preselected base (e.g., adenine, guanine, 6-mercaptoguanine, 8-oxo-guanine, and 8-oxo-adenine) comprises (a) reacting the nucleic acid with a transition metal complex capable of oxidizing the preselected base in an oxidation-reduction reaction; (b) detecting the oxidation-reduction reaction; and (c) determining the presence or absence of the nucleic acid from the detected oxidation-reduction reaction at the preselected base. The method may be used in a variety of applications, including DNA sequencing, diagnostic assays, and quantitative analysis.

106 Claims, 11 Drawing Sheets

- U.S. Patent 5,871,918
- Inventors: Thorp, Johnston, Napier, Loomis, Sistare, Kim
- 139 claims including CIP
- Filing date: June 1995
- Xanthon technology now encompasses over 15 US patents

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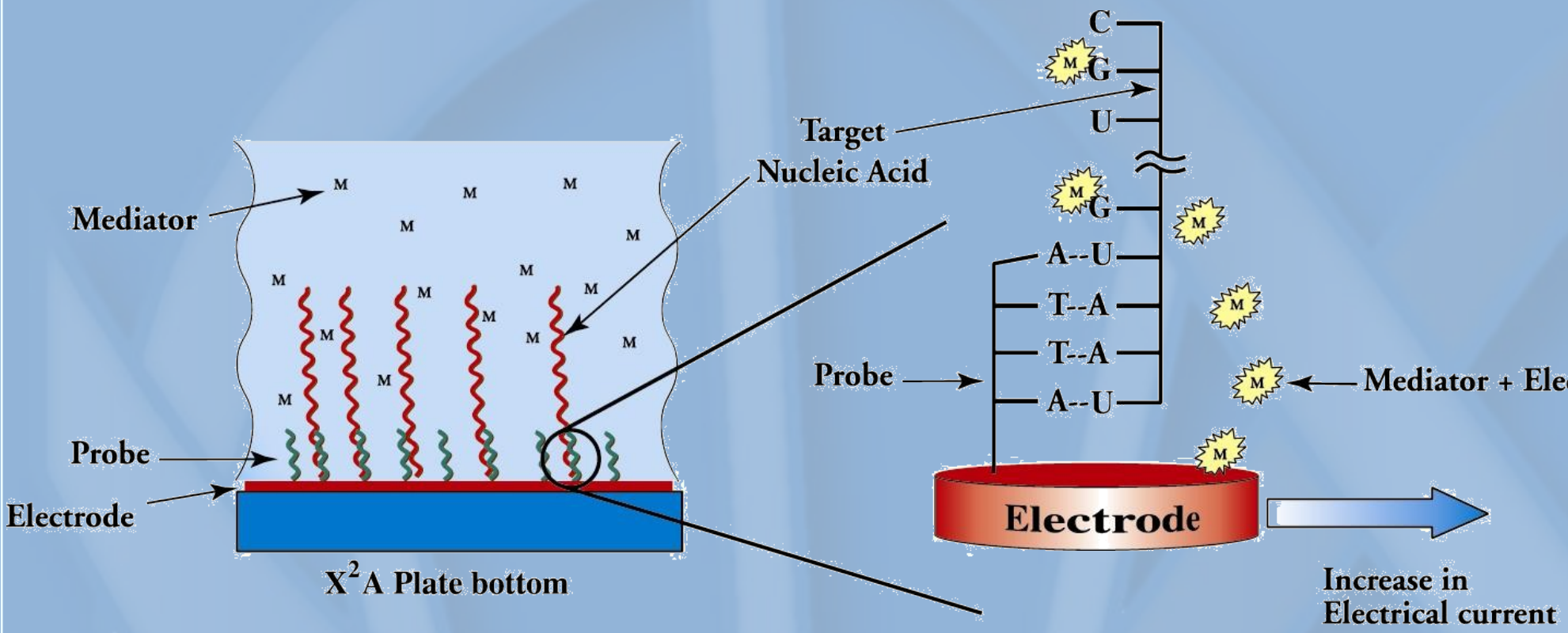
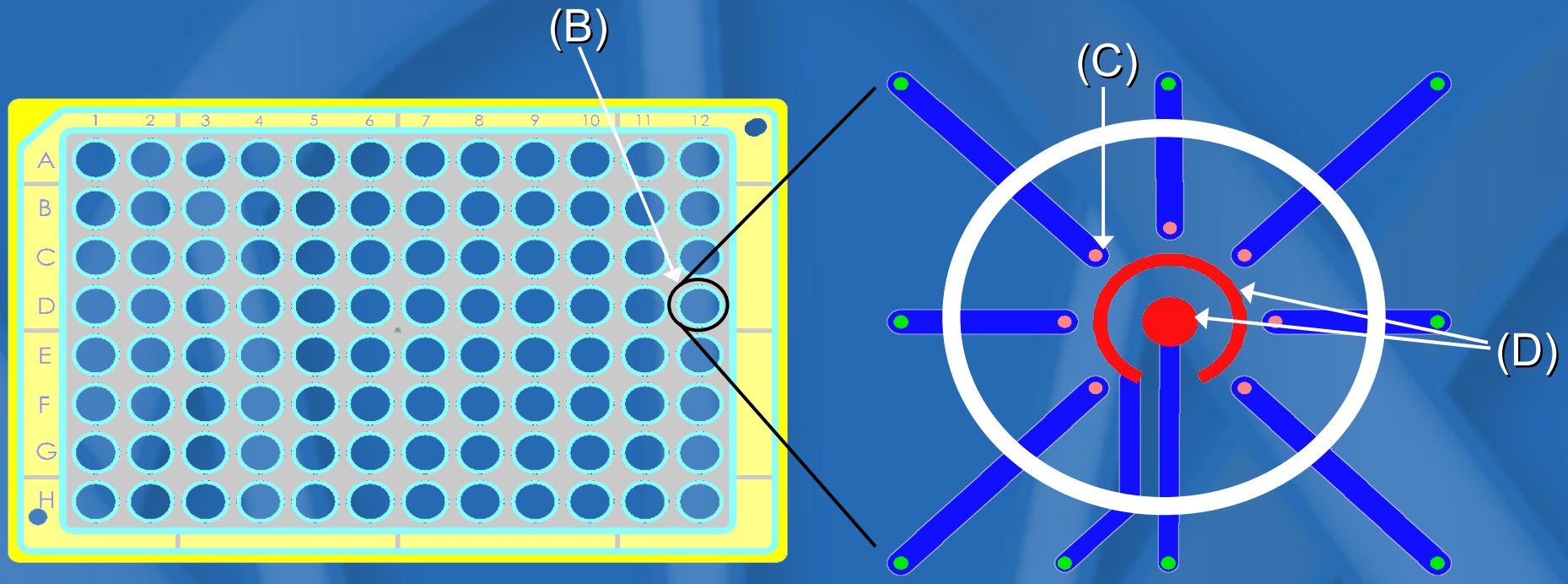
Detection of Target Nucleic Acids



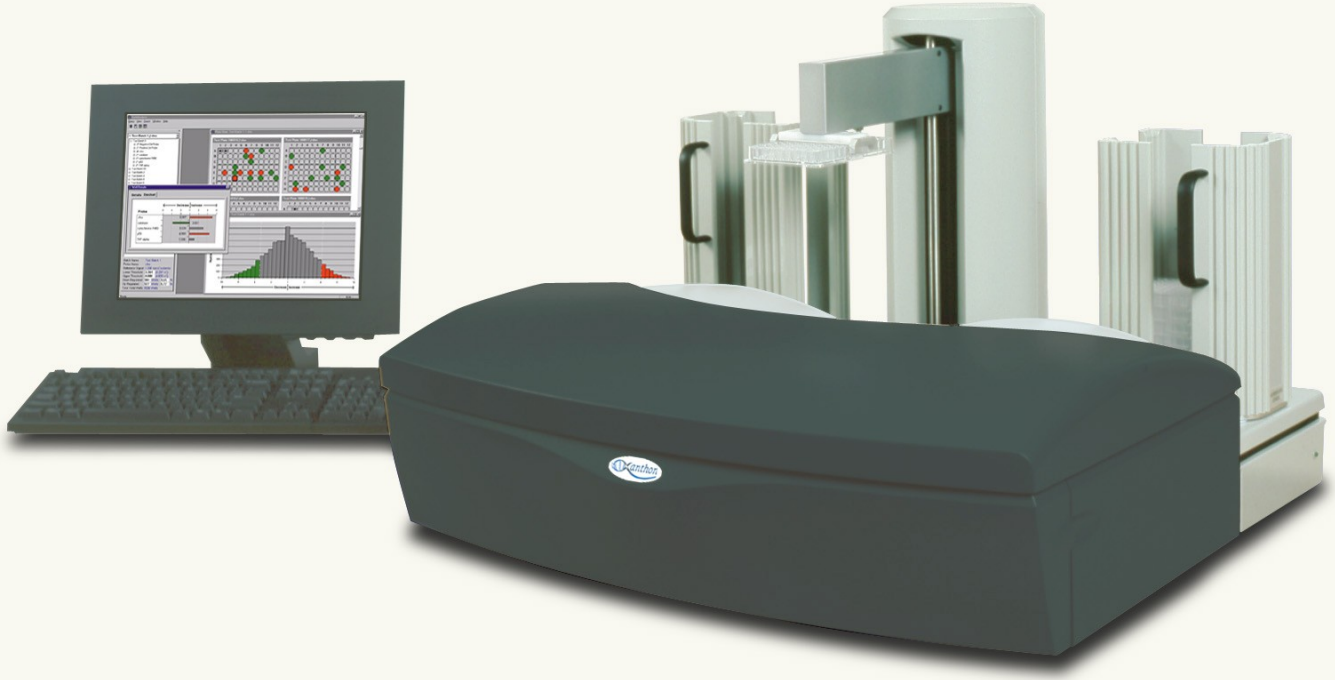
The Plate



(A)

A) The Plate
B) One well of the Plate
C) Electrodes: seven in each well,
5 samples, 2 controls
D) Reference and counter electrodes

Xanthon Xpression Analysis System™ (X²AS)



- **High-throughput**
  - > 27,000 samples/day
  - > 190,000 assays/day
- **Multiplex**
  - 7 assays per sample
- **Direct Detection**
  - (No labels)
- **Universal Format**
- **Assay Simplicity**
- **Assay Flexibility**
- **Assay Quality**

SAFE FRAME. ONLY REMOVE WHEN SHOOTING SLIDES OR PROJECTING FROM LAPTOP

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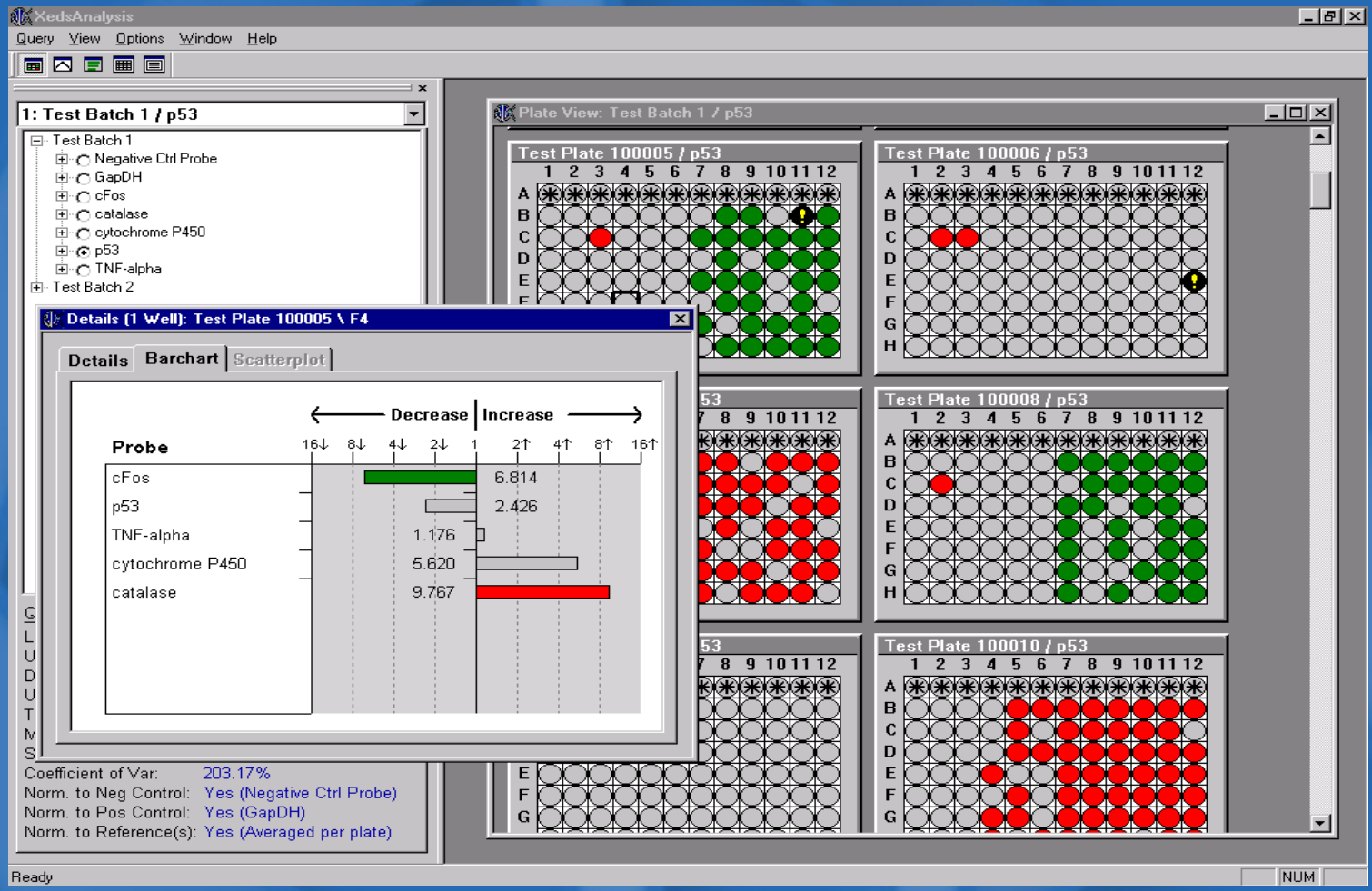
Powerful Bioinformatics Software



Xanthon Sales and Marketing

Trade Show Booth

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High Throughput Systems For Expression Analysis & SNP Detection.

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info@xanthon.net

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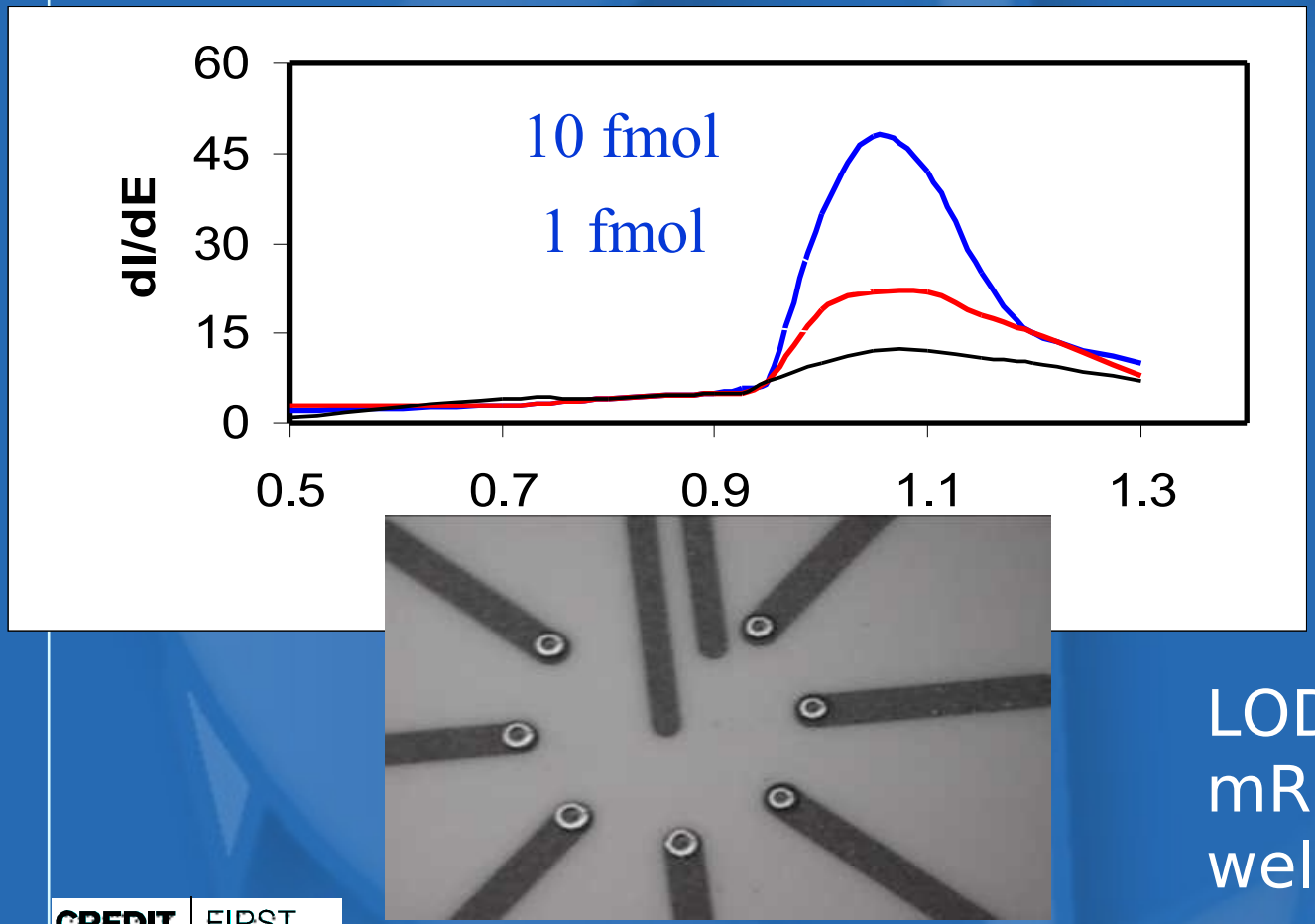
VISIT US AT BOOTH #220

mRNA Detection



Target: ApoA1 mRNA in cell lysate

LOD: 250 amol of ApoA1 mRNA in cell lysate in 50 µ well

Development Status:
Xanthon Xpression Analysis System™

- ☑ **Xanthon Xpression Analysis Instrument**
  - ☑ **Plate reader**
  - ☑ **Plate handler**
  - ☑ **Control software**
- ☑ **Xanthon Xpression Software Module**
- ☑ **Xanthon Xpression Analysis Plate**
  - ☑ **Test procedure**
  - ☐ **Optimize plate manufacturing**
  - ☐ **Optimize reagents**

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UNC-Motorola

MOTOROLA
intelligence everywhere™

- Xanthon's principal competitor Clinical Micro Sensors (eSensor) acquired by Motorola for $300M in March 2000
- Xanthon pursues IPO etc. anyway
- Motorola acquires Xanthon technology for debt in January 2003
- UNC-Motorola relationship continues

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Xanthon Story – Latest Developments

- HT becomes Xanthon president after MOT sale
- GE Capital forces Xanthon into Chapter 7 bankruptcy
- Court/GE dismisses bankruptcy
- MOT support upped to $1.1 M
- Osmetech LLC acquires CMS/Xanthon IP from Motorola
- Jan 2006: Osmetech gets FDA approval for eSensor based on Xanthon and Motorola IP!!!

What did I learn? – The $30M MBA

1. Always have a unique story – Garcia's Law
2. Wait for the right CEO – right mix of science and business skills
3. Have a national focus (not just regional) – technology and investor group
4. Don't bet it all on just one technology
5. Assume the market is going to get bad
6. Don't build a sales force for a product that doesn't exist.

Morehead Planetarium and Science Center 2001 - 2004

1. Unique story: only student-fronted science center in world
2. Wait for right CEO: became interim CEO myself rather than take the wrong person, scrapped first succession plan
3. National focus: made planetarium shows and films that are exhibited at other great institutions (AMNH)
4. Don't bet on one technology: added films and camps to star theater as revenue generators

Doubled revenue in 3 years.

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