

SciGene

Automating Cytogenetics

Presenters



Jim Stanchfield, Ph.D.
SciGene Founder and CEO



Gary Henderson
Sales Manager, North America

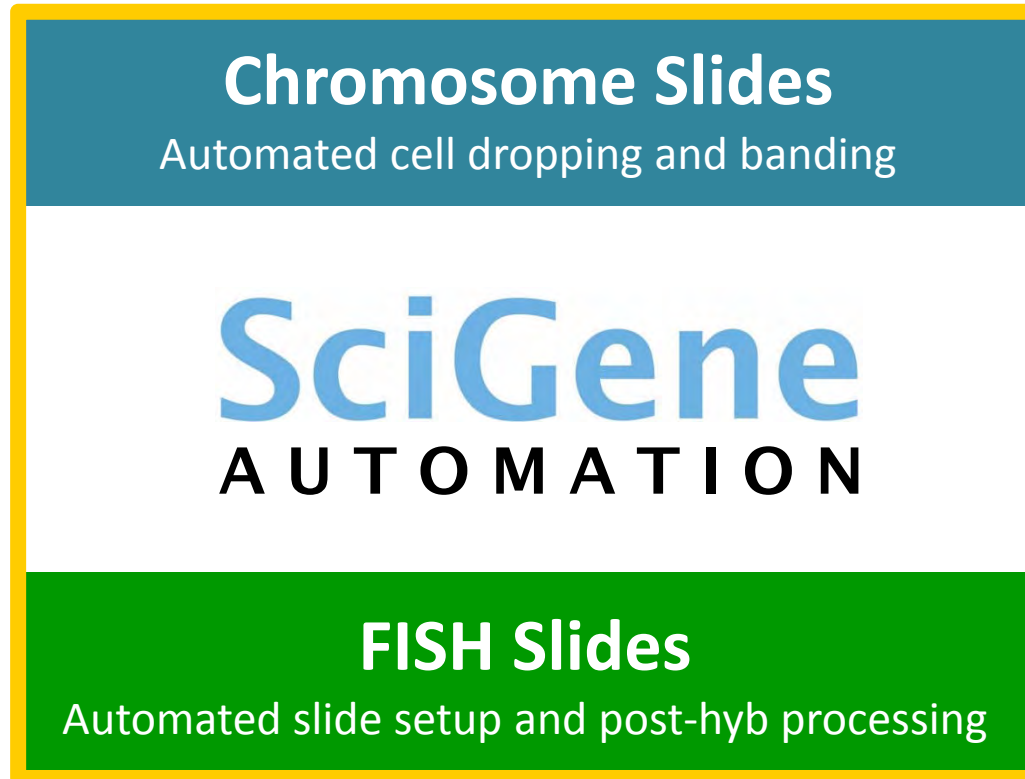
About SciGene

- Founded in 2004
- Provide automated solutions for cytogenetics

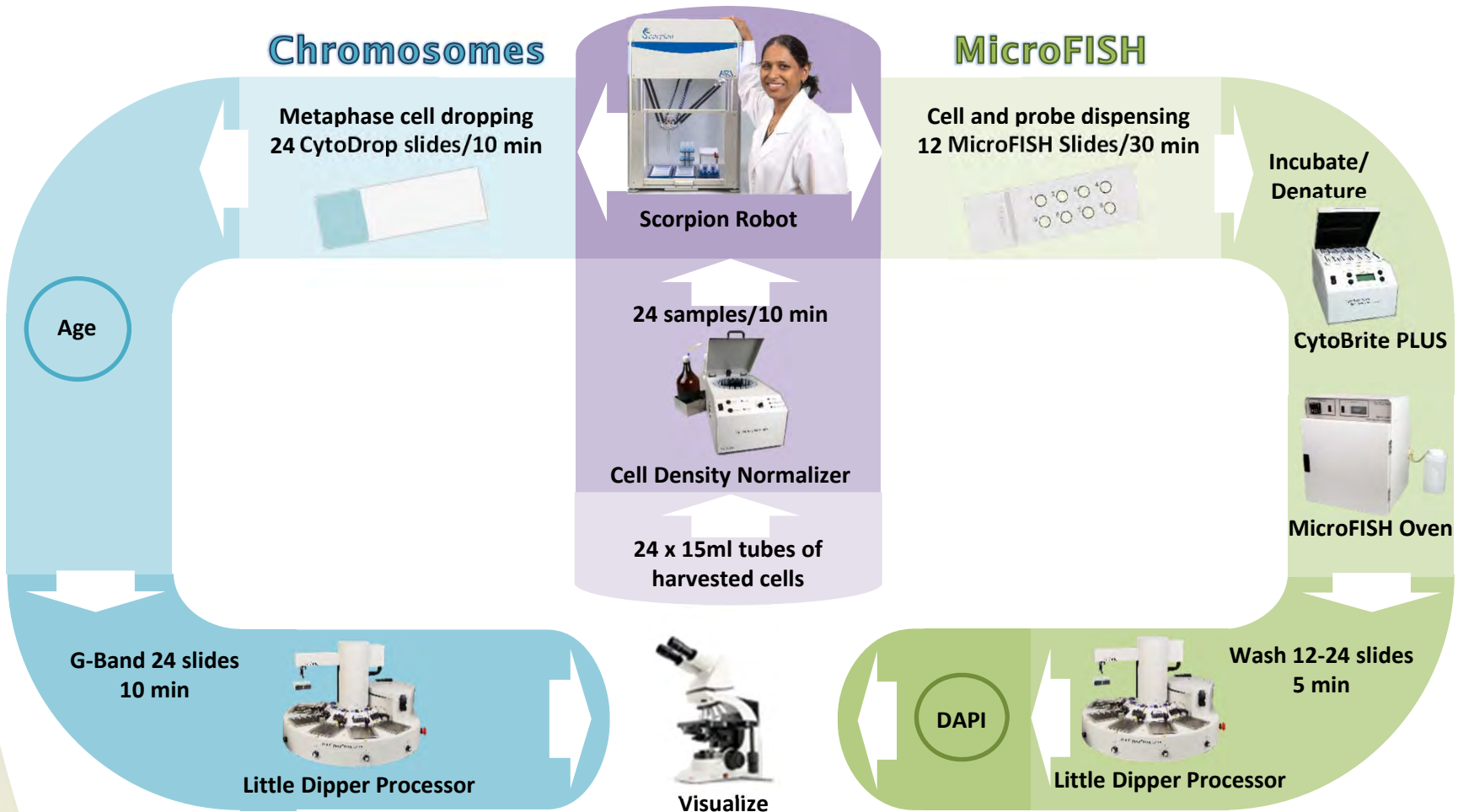
***We reduce the cost and complexity
of cytogenetic bench work!***

Automating the Cytogenetics Lab

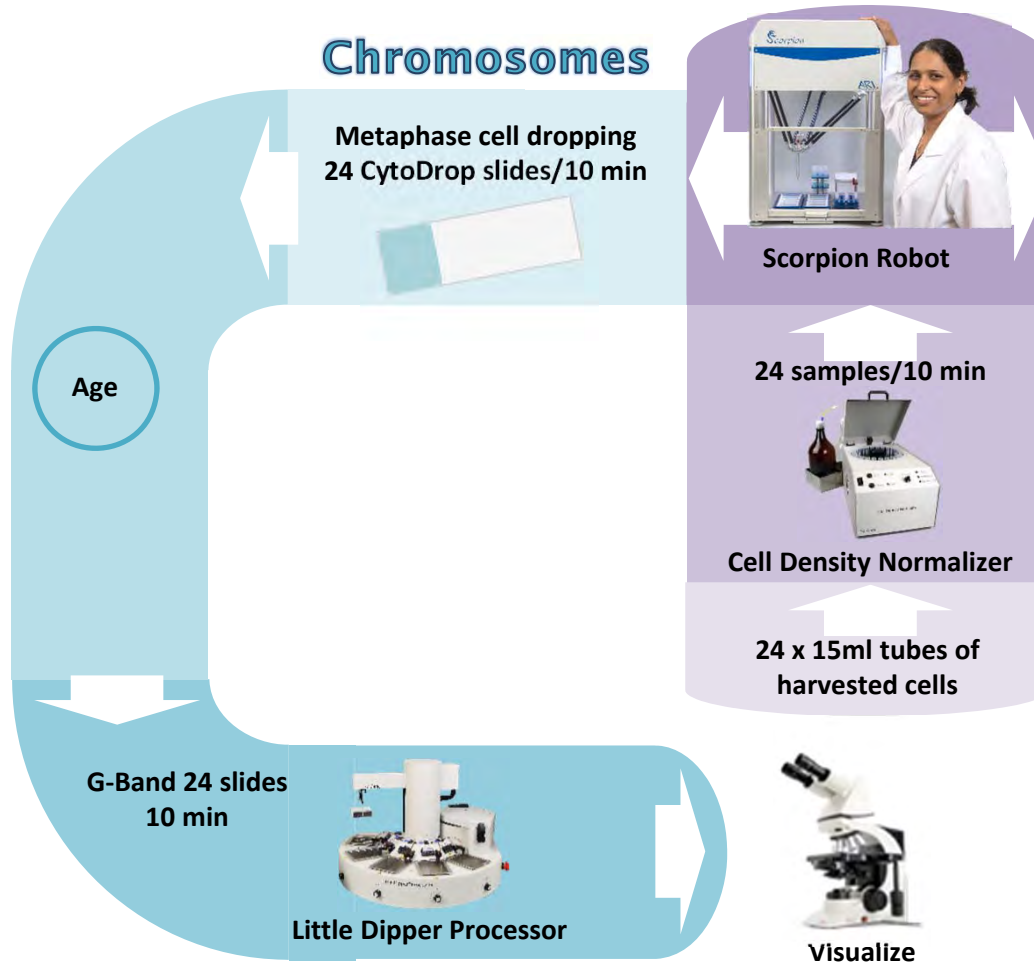
Everything Between Harvester and Microscope



Automating the Cytogenetics Laboratory



Automated Dropping and Banding of Chromosome Slides



Factors Affecting Metaphase Slide Quality

- 1 Density of cell sample
- 2 Slide dropping technique
- 3 Slide drying conditions
- 4 Slide wettability
- 5 G-Banding consistency

Cell Density Normalizer

Eliminates Cell Density Variations that Effect Metaphase Spreading



**Insert up to 24
tubes with pellets.**

**Adjust cell densities of
24 samples in 10 min.**

**Place tubes in
Scorpion Robot.**

Factors Affecting Metaphase Slide Quality

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Differences in Slide Dropping Techniques Can Affect Results

Dropping height?

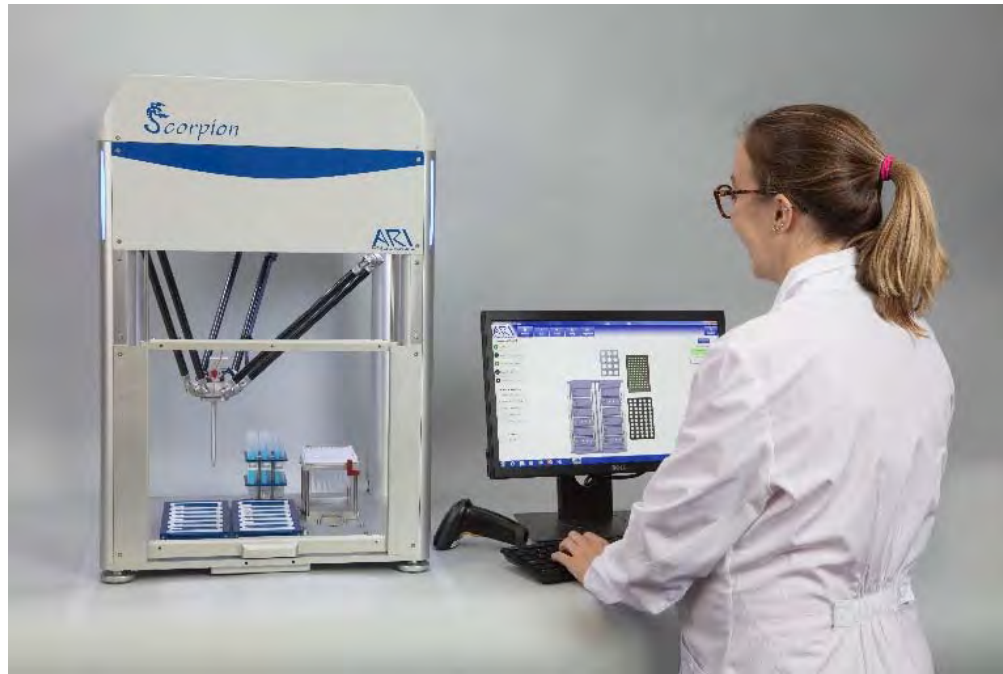
Wet or dry slide?



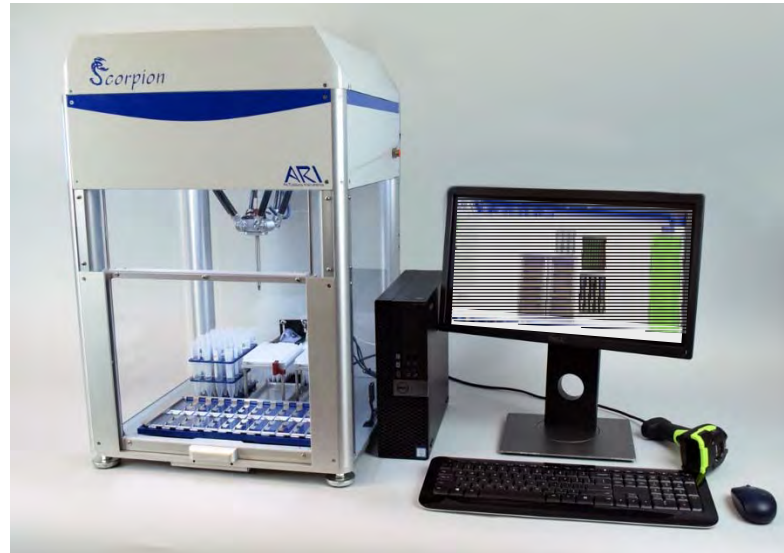
Dropping angle?

Wet paper towel?

Scorpion™ Slide Preparation Robot Chromosome Slides



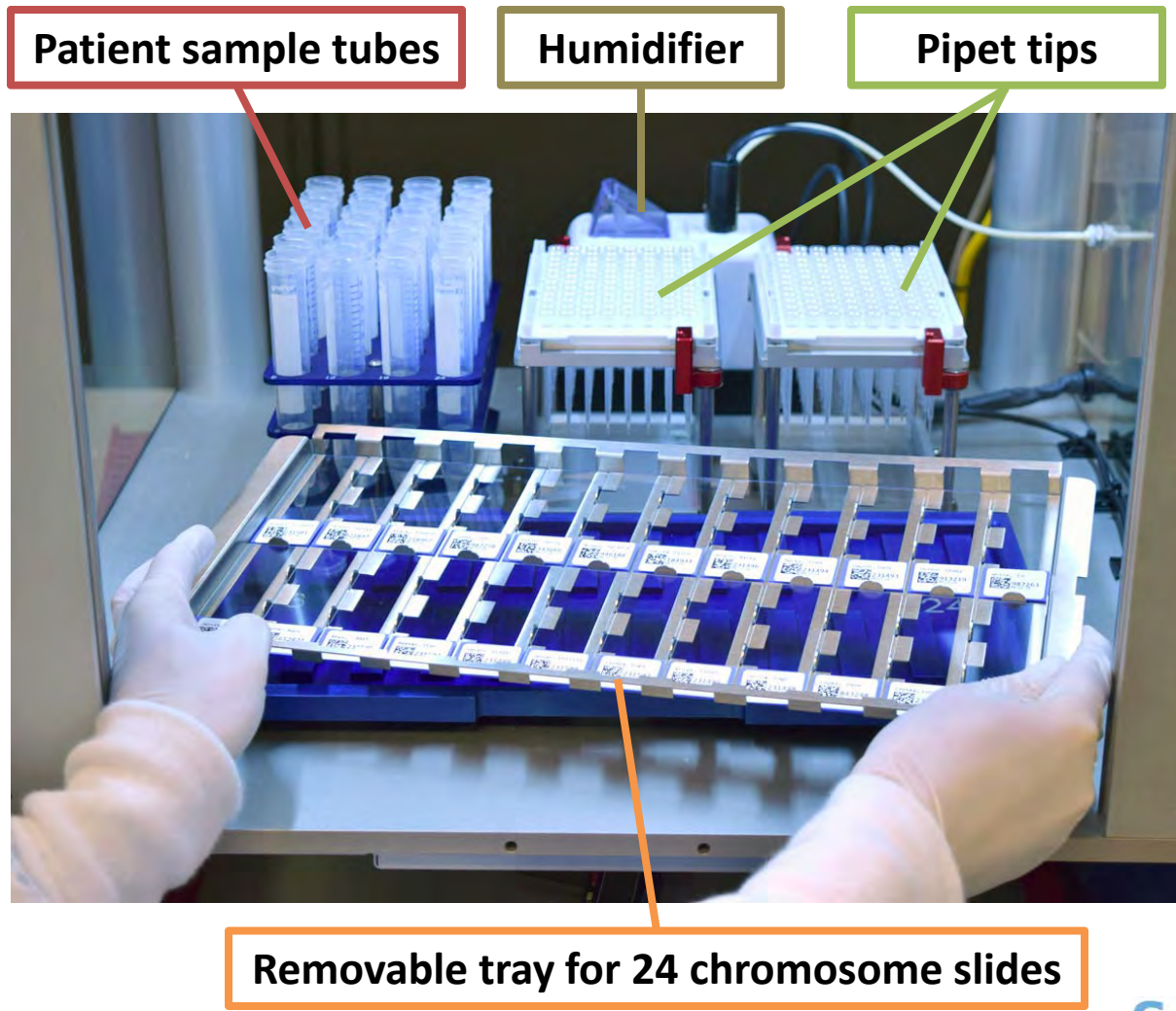
Scorpion Preparation of Chromosome Slides Eliminates Variations in Dropping Technique



- Scorpion Robot is smaller than a lab incubator
- Maintains consistent drop volumes, dispense speeds and patterns
- Makes 24 slides in < 10 minutes, ready for aging
- Removable 24-slide trays directly transfer into oven
- Barcode reader matches samples and slides / no mix-ups

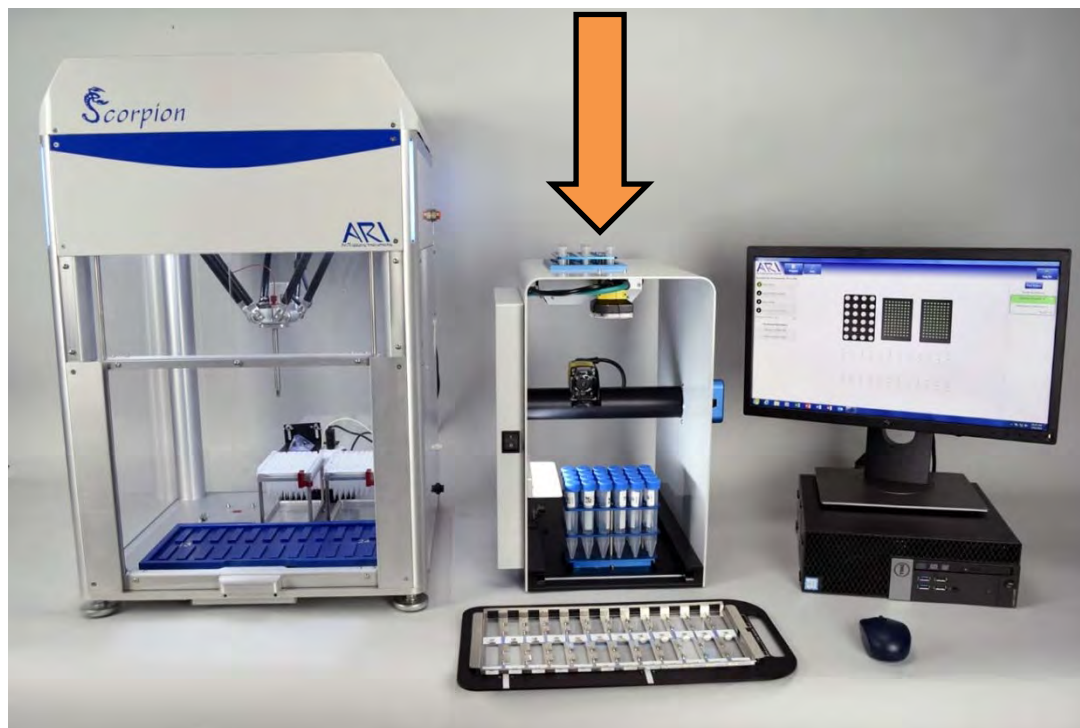
Scorpion Preparation of Chromosome Slides

Deck Setup



Scorpion Barcode Reading Station

Eliminates Sample/Slide/Probe Mix-ups



- Barcode reader matches samples and slides
- Prevents sample, slide and probe mix-ups
- Reduces data entry; speeds setup

Scorpion Barcode Reading Station

Scan Sample Tubes and Place in Rack

Primary camera



Show tube barcode to the primary camera.

Secondary camera



Place tube in any position in rack. Secondary camera transmits location to the pipetting system.

Scorpion Barcode Reading Station

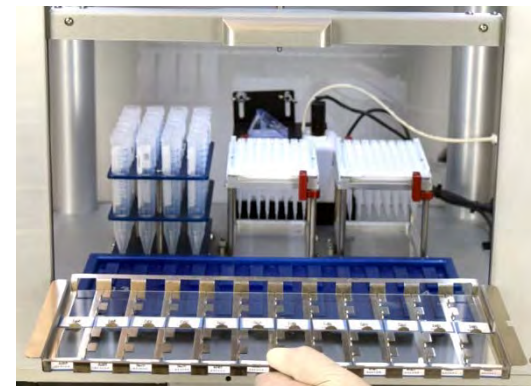
Scan Slide Tray / Place Rack and Tray in Robot



Move tray with barcoded slides past primary camera.



Place tube rack in Robot



Place slide tray in Robot

Scorpion Preparation of Chromosome Slides

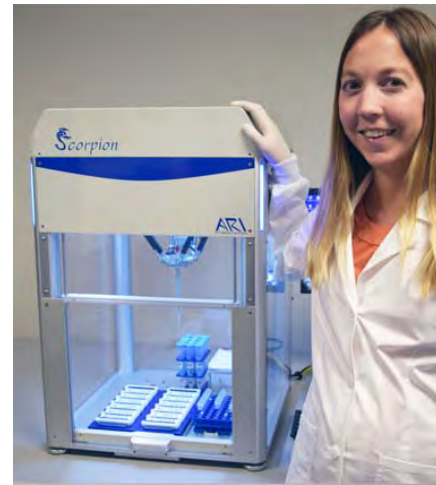
Saves > 3 Hours Labor per 96 Slides

Manual Preparation



4 hours

Scorpion Slide Prep

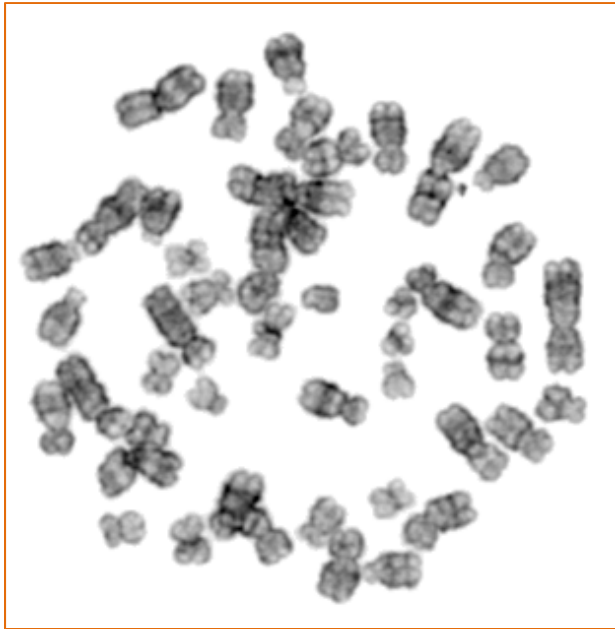


20 minutes

Factors Affecting Metaphase Slide Quality

- 1 Density of cell sample
- 2 Slide dropping technique
- 3 Slide drying conditions
- 4 Slide wettability
- 5 G-Banding consistency

Slide Drying Conditions Affect Metaphase Spreading



⬇ Low Humidity



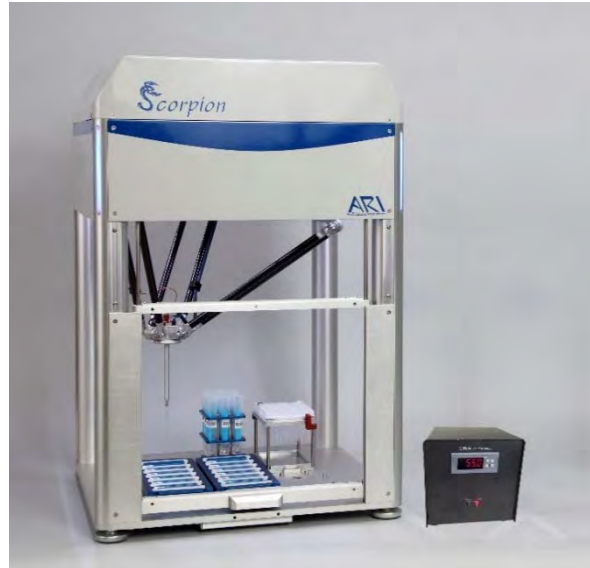
⬆ High Humidity

Slide Drying Conditions Affect Metaphase Spreading



Optimal Humidity

Scorpion Controls Slide Drying Optimizes Metaphase Spreading



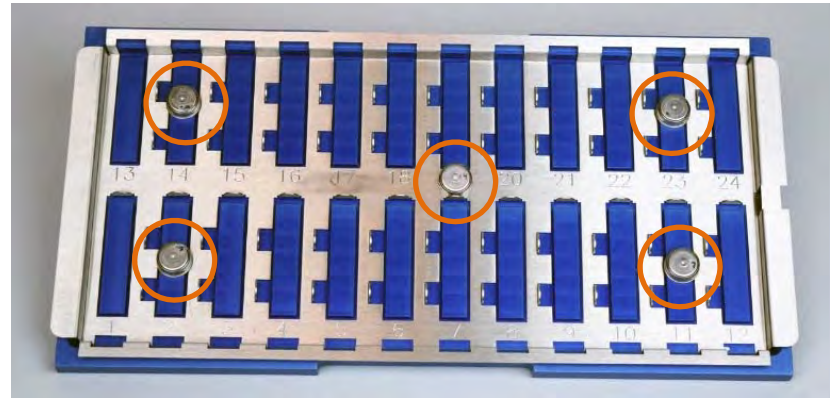
- Precisely controls slide drying conditions
- Regulates humidity to $\pm 1\%$ RH
- Change humidity levels in under 2 minutes

Scorpion Controls Slide Drying

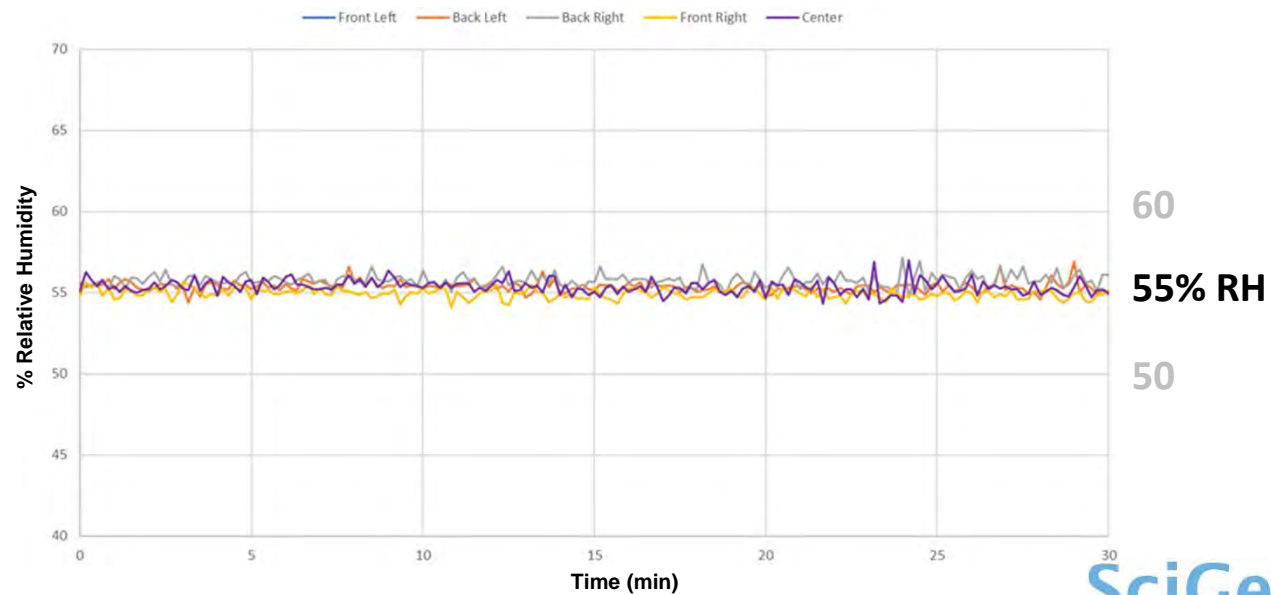
Well Regulated / Uniform Humidity



iButton humidity datalogger



iButtons placed on chromosome slide tray

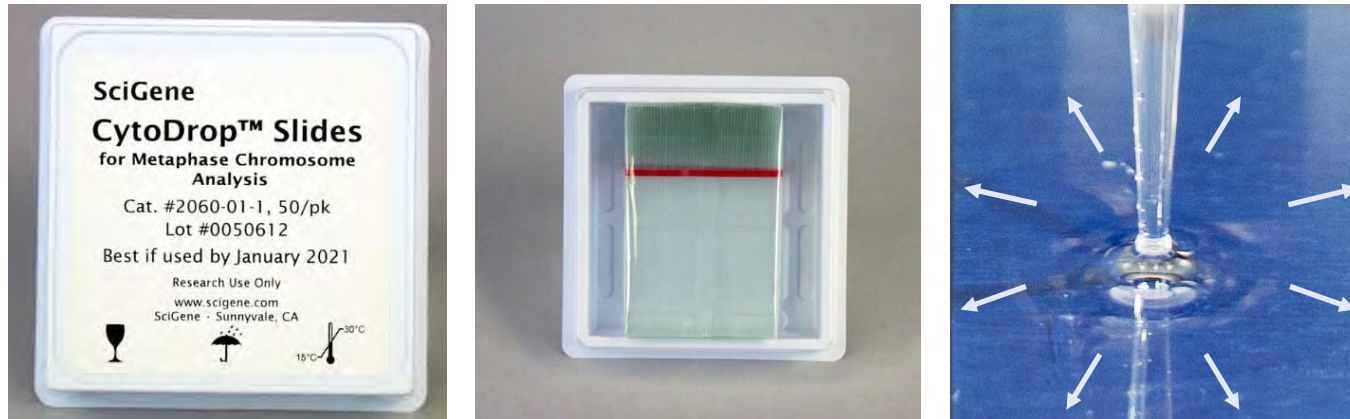


Factors Affecting Metaphase Slide Quality

- 1 Density of cell sample
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- 4 Slide wettability**
- 5 G-Banding consistency

CytoDrop™ Slides for Chromosome Analysis

Consistent Wettability / Reliable Sample Spreading



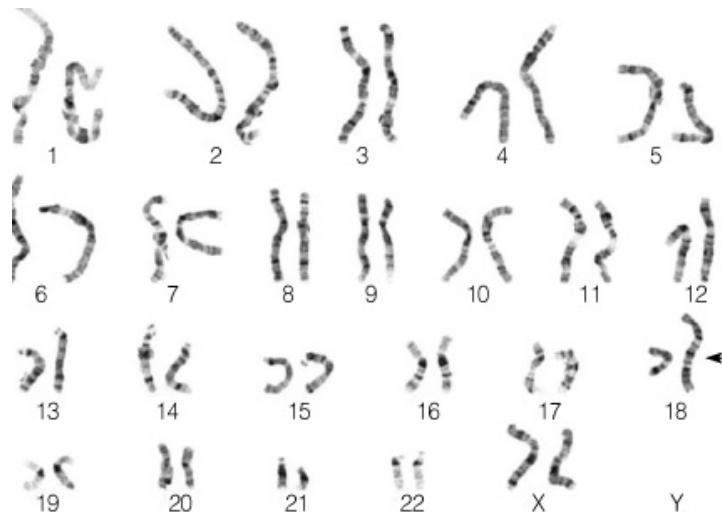
- Manufactured for SciGene by a non-U.S. glass company
- Every slide a good slide; no slides stuck together
- Lot tested for wettability
- Lot tested on the Scorpion Robot
- Ready to use – no cleaning or treatment needed
- Each “slide brick” sealed in plastic with two-year shelf life.

Factors Affecting Metaphase Slide Quality

- 1 Density of cell sample
- 2 Slide dropping technique
- 3 Slide drying conditions
- 4 Slide wettability
- 5 G-Banding consistency

Little Dipper® Processor for G-Banding

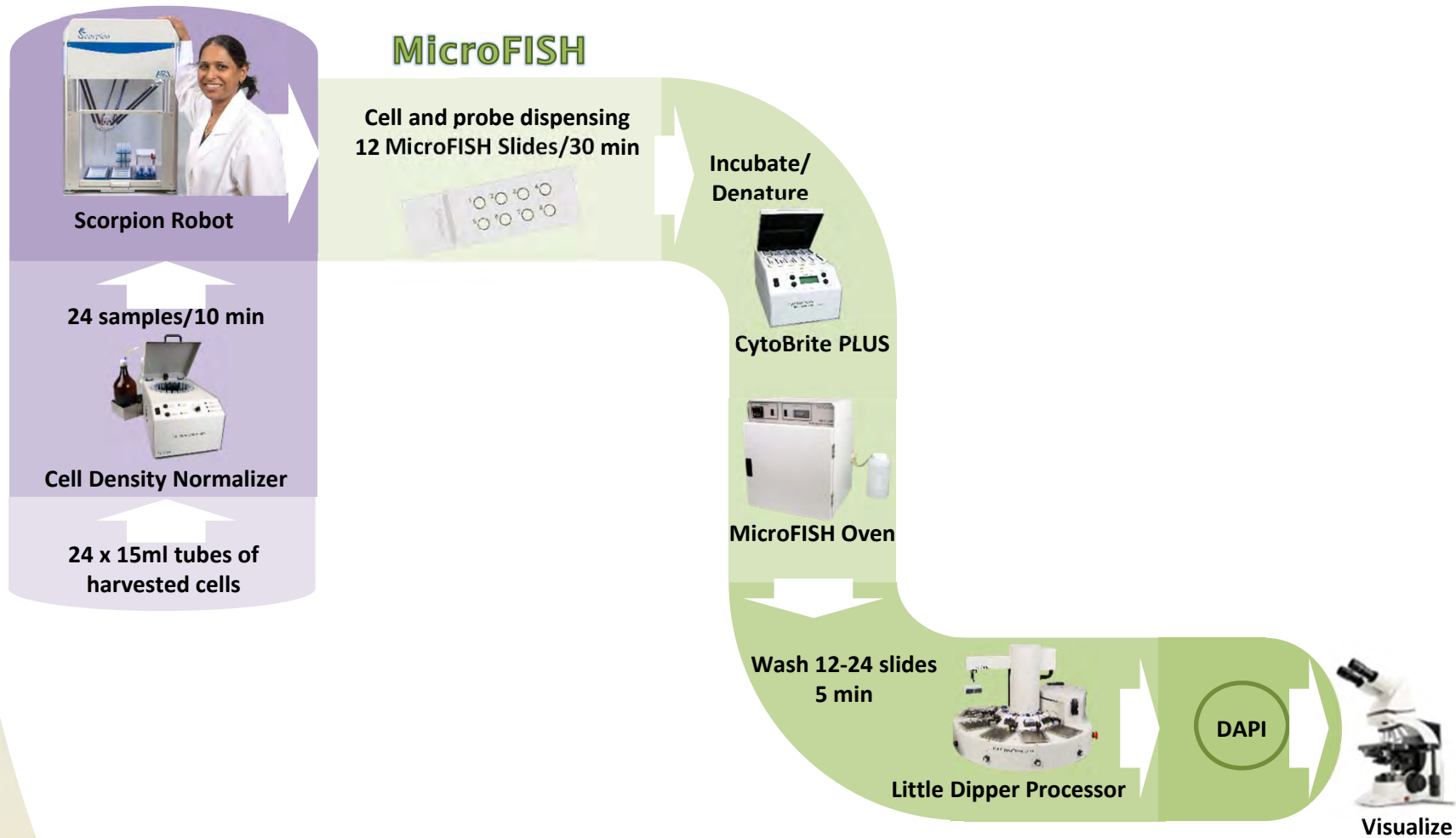
Consistent Results Day-to-Day/Batch-to-Batch



- Processes 12 or 24 slides per batch
- Five reagent baths; 275ml low volume or 650ml standard
- Stir bar agitation for uniform digestion and staining
- Quickly optimize trypsin and stain times
- Slides dried automatically with built-in centrifuge

Scorpion Slide Preparation Robot

Automated Preparation of MicroFISH Slides



Most Labs Lose Money Running FISH



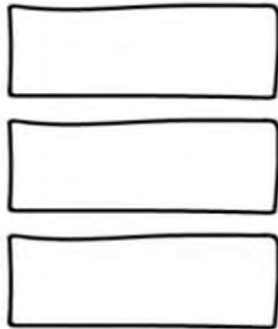
2019 reimbursement: **\$51.19** per hybridization
(CPT 88275 Interphase FISH 100-300 cells)

Cost of Typical Six Probe Panel

\$30 per hyb: \$180 per panel

Slides

3



Coverslips

6



Rubber
Cement



Setting up FISH Panels is a Lot of Work

2.5 hours per 36 slides



- Difficult to finish daily workload
- Requires multiple slides and coverslips per patient
- Tedious to seal coverslips with rubber cement

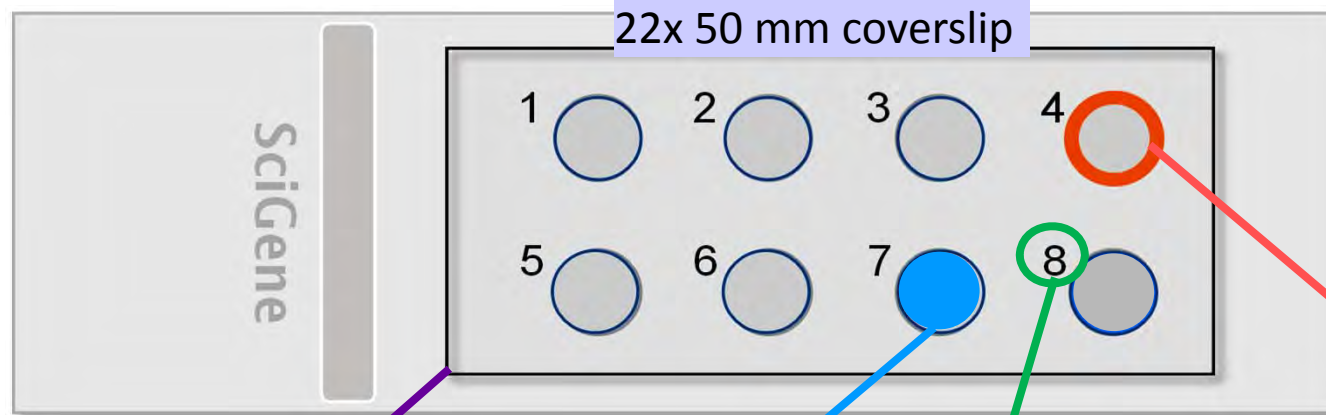
MicroFISH® System

MicroFISH[®] Assay System

A simple system for performing cellular FISH panels that uses a single slide per patient and 1 μ l cell sample and 1 μ l probe solution per well.

MicroFISH® Slide

Single Patient Slide for up to 8 Probes



1 coverslip — No sealant.

1 μ l wells conserve samples.

Wells numbered individually.

Coating retains samples in wells.

MicroFISH® System Used with All Probes

Same Workflow for All Suppliers



MicroFISH® is a Proven Technology

>250,000 Patient Samples Processed

AmeriPath®
A Quest Diagnostics Company



SCHOOL OF MEDICINE
Colorado Genetics Laboratory
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS



THE OHIO STATE
UNIVERSITY

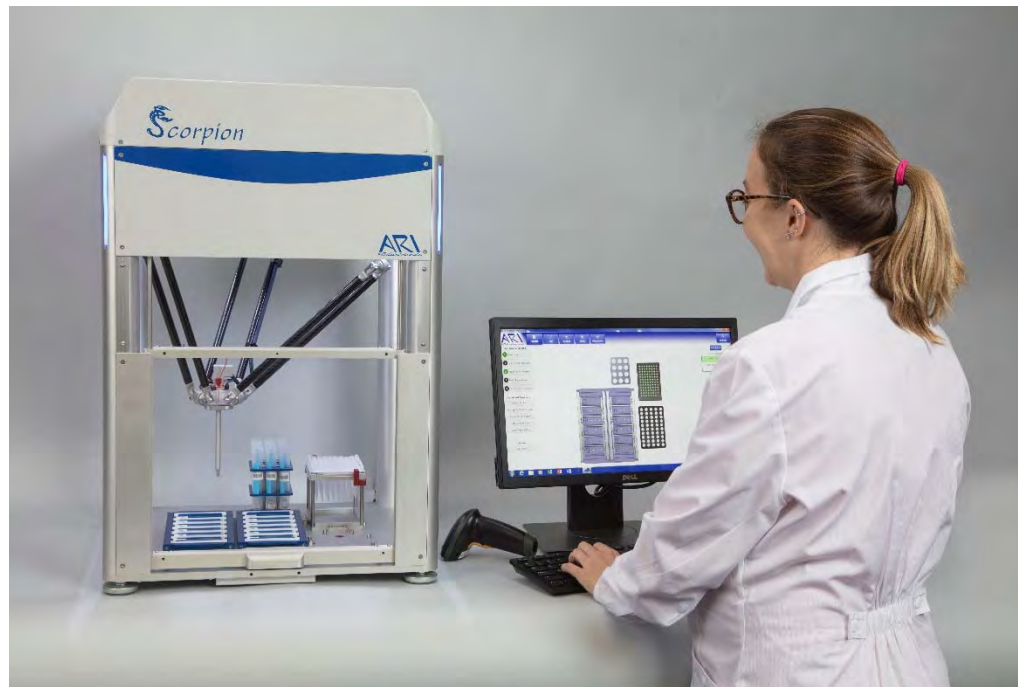


Stanford
HEALTH CARE
STANFORD MEDICINE



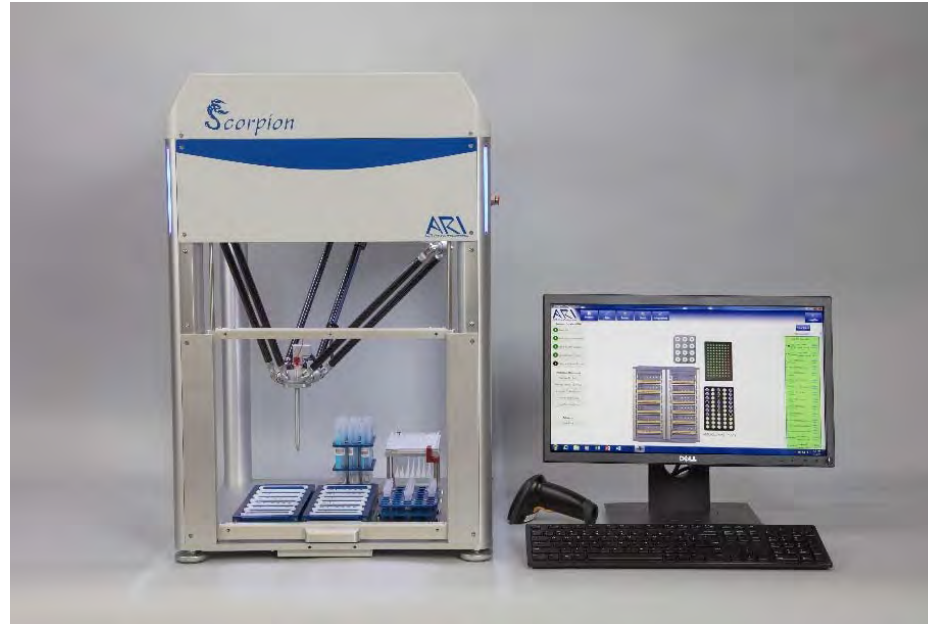
UPMC
University of Pittsburgh
Medical Center

Scorpion™ Slide Preparation Robot MicroFISH® Slides



Scorpion Preparation of MicroFISH® Slides

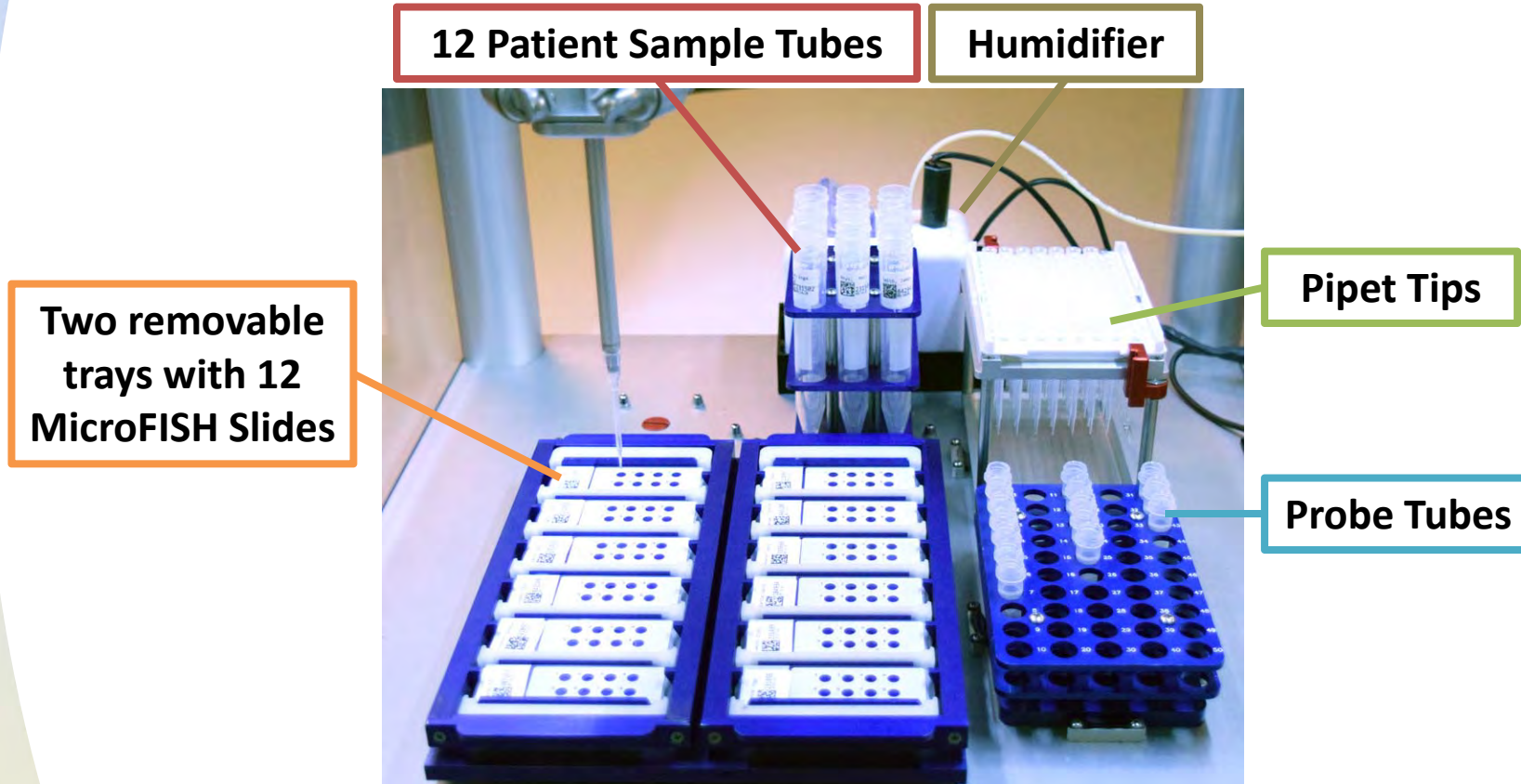
Makes 12 MicroFISH Slides/96 hybs < 30 minutes



- Automates both cell and probe dispensing
- Barcode reading system prevents sample, slide and probe mix-ups
- Each hybridization detailed in a patient report
- At-a-glance probe inventory reports

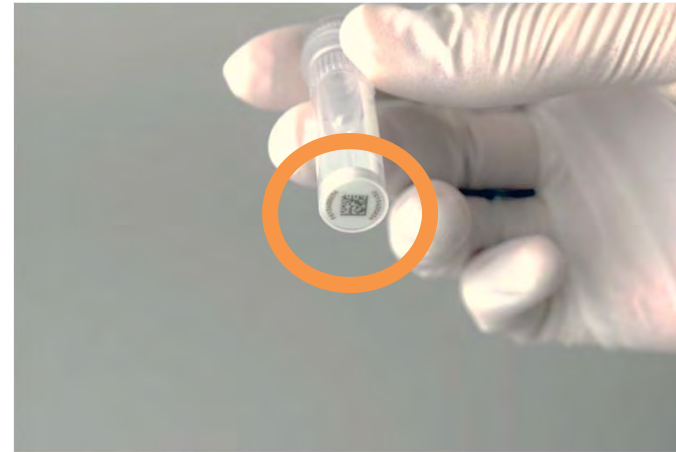
Scorpion Preparation of MicroFISH® Slides

Deck Set Up



Scorpion Preparation of MicroFISH® Slides

No Probe Waste / No Probe Mix-ups



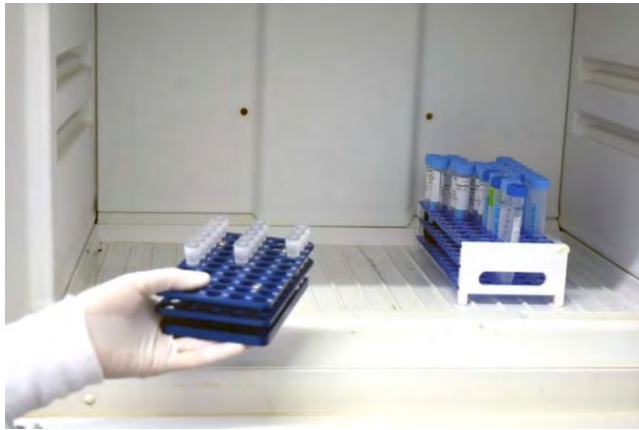
Free standing PCR-type tube with barcode



Robot draws from bottom / no dead volume

Scorpion Preparation of MicroFISH Slides

Probe Tube Rack System



Remove rack from freezer



Place caps in organizer



Scan barcodes on reader



Place tube rack on deck

Scorpion Preparation of MicroFISH® Slides

Makes 12 Slides / 96 Hybs in < 30 Minutes

Robotic Steps	Time (min)
1. Dispenses 1 μ l cells from 12 patient tubes into 96 wells	3
2. Pauses 3 minutes for cells to dry	3
3. Dispenses 1 μ l of probes into 96 wells	15
Elapsed Time:	21 min

Simple and Fast MicroFISH® Workflow

Place Coverslip / No Rubber Cement



Simple and Fast MicroFISH® Workflow

Denature on CytoBrite® PLUS



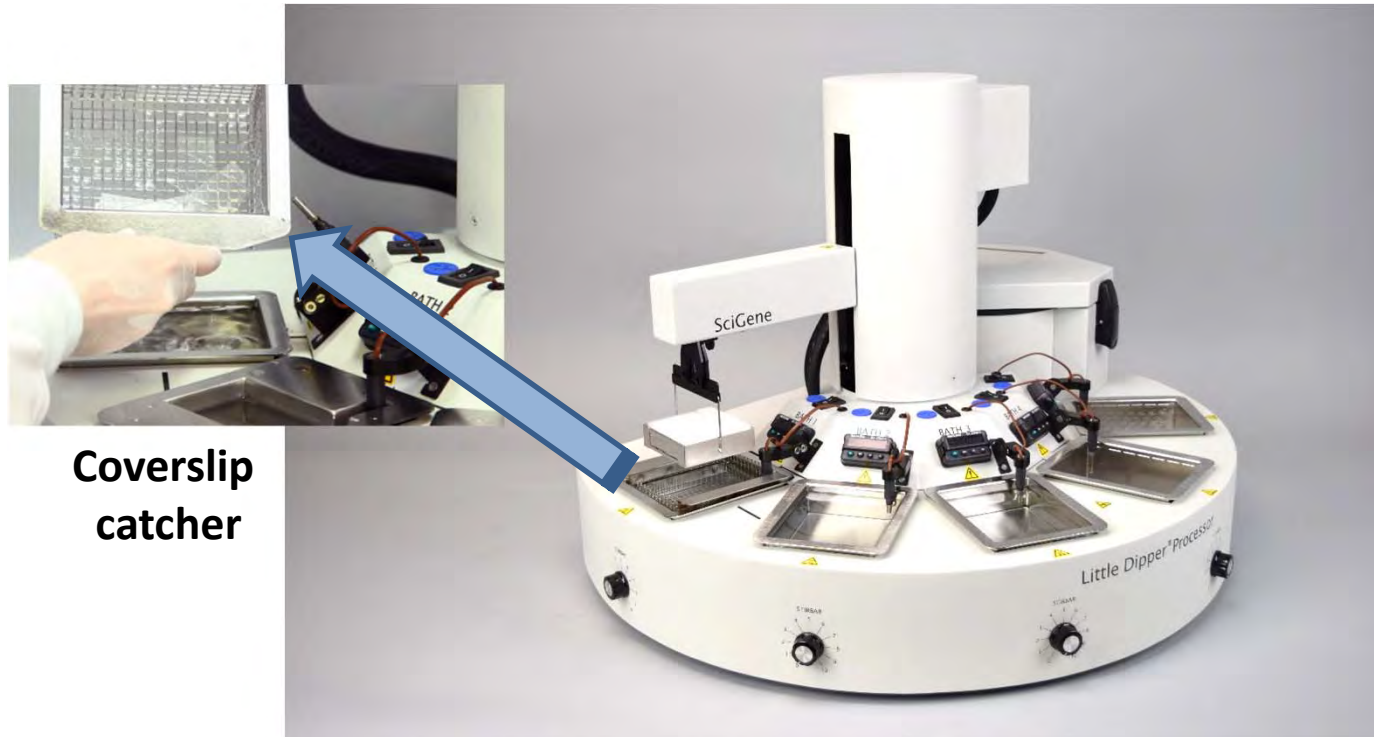
Simple and Fast MicroFISH® Workflow

Incubate in MicroFISH® Oven



Simple and Fast MicroFISH® Workflow

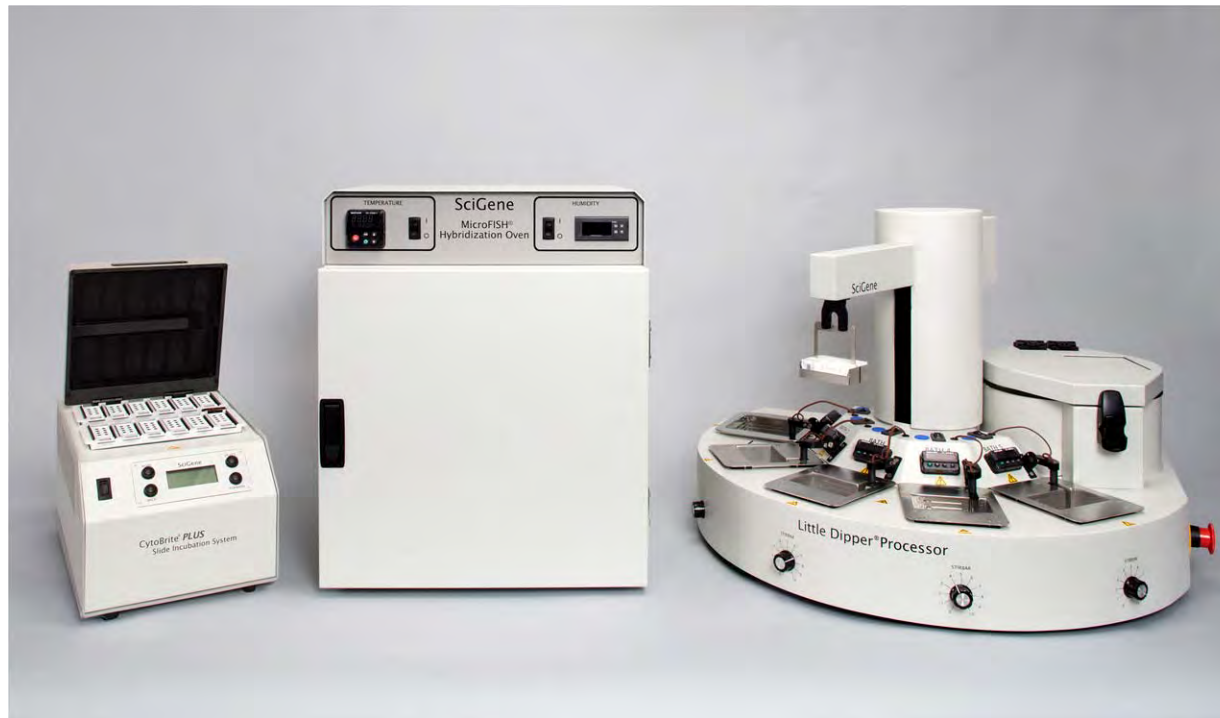
Shake Off Coverslips / Post-Hyb Wash



Coverslip
catcher

Little Dipper® Processor

MicroFISH® Instrumentation



CytoBrite® *PLUS* Slide Incubation System

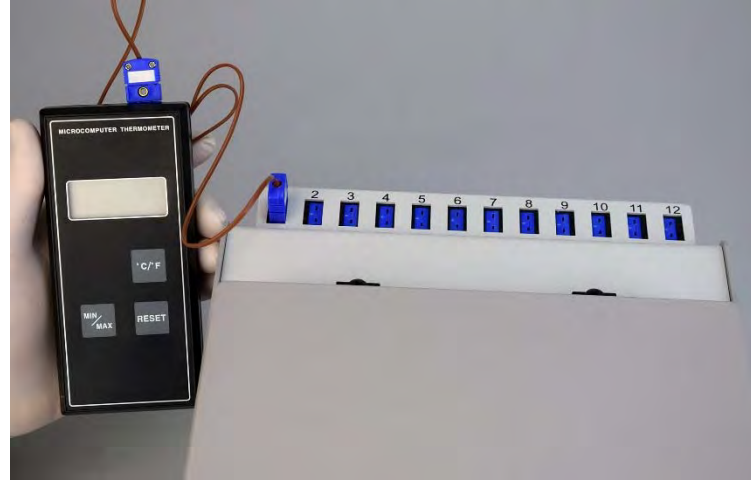
Monitors Temperature of Every Slide Position



- Meets CAP Regulation CYG.33950 for checking slide position temps
- PCR technology for rapid/uniform heating and cooling
- Removable slide trays streamline handling

CytoBrite® PLUS Slide Incubation System

Slide Temperature Verification



- Each slide position equipped with temperature sensor wired to a thermometer jack
- Connect the provided thermometer to view each slide position temperature

MicroFISH[®] Hybridization Oven

Enhances Probe Signals in MicroFISH[®] Slides

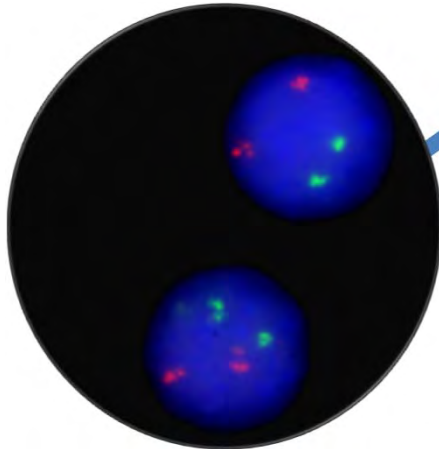


- For hybridizing MicroFISH[®] Slides
- Controls temperature and humidity
- Enhances signals by controlling probe volume
- Slide trays transferred directly from CytoBrite[®] PLUS

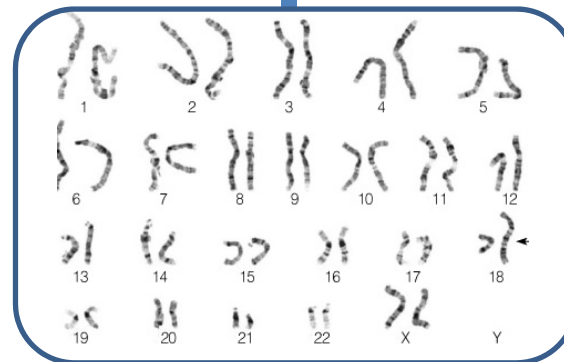
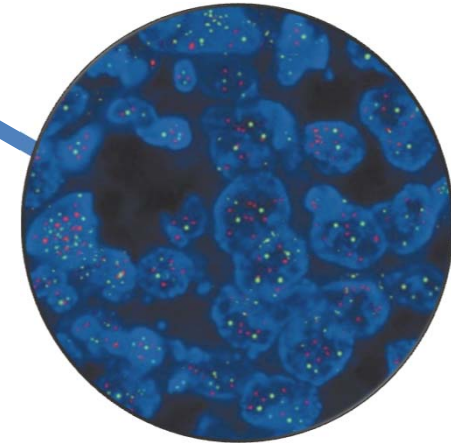
Little Dipper® Processor

Multipurpose Cytogenetic Slide Processor

Post-Hyb
Processing



Tissue
Pretreatment



G Banding

Wrap Up

Scorpion Cuts Labor > 95% Chromosome and FISH Slides



Scorpion for Chromosome Slide Set Up

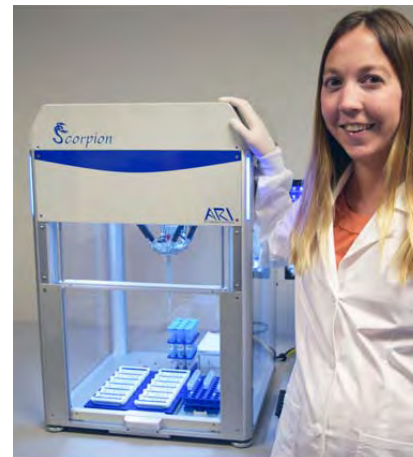
Saves Typical Lab > 800 Labor Hours per Year

Manual Preparation
100 slides/day



900 hrs/year

Scorpion Robot
100 slides/day



90 hrs/year

Little Dipper for Chromosome G-Banding

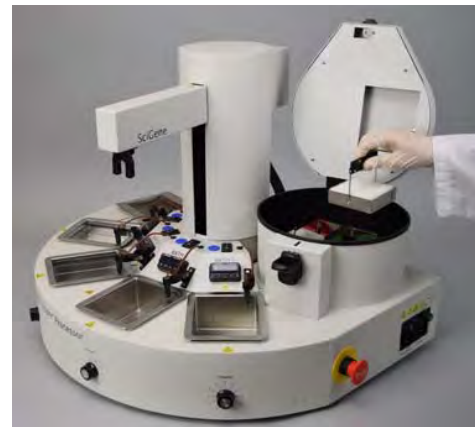
Saves a Typical Lab > 270 Labor Hours per Year

Manual G-Banding
100 slides/day



360 hrs/year

Little Dipper® Processor
100 slides/day



90 hrs/year

Scorpion for MicroFISH Slide Setup

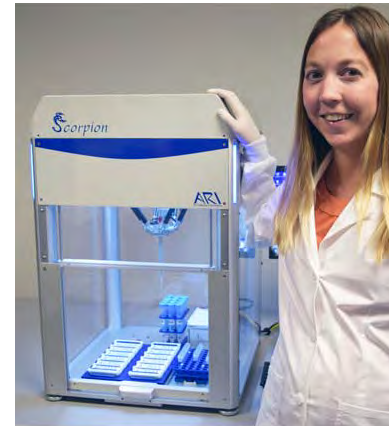
Saves Typical Lab > 400 Hours of Labor per Year

Manual Preparation
40 patients/120 slides per wk



433 hours/year

Scorpion Robot
40 patients/40 slides per wk



14 hours/year

Little Dipper Processing of MicroFISH® Slides

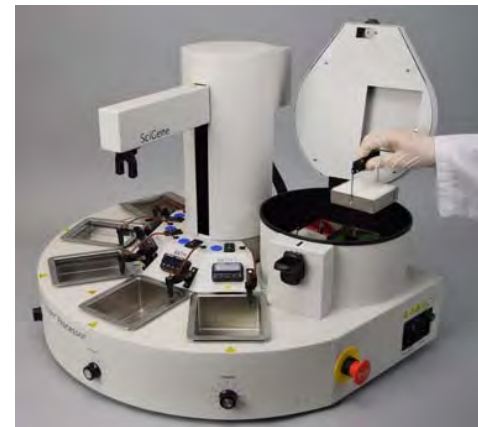
Saves Typical Lab > 225 Hours Labor Per Year

Manual Slide Processing
120 slides/week



260 hrs/year

Little Dipper Processing
40 slides/week



22 hrs/year

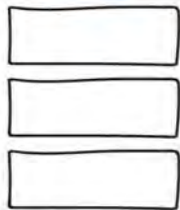
MicroFISH® System Economics

Reduces Probe Cost per Test > 80%

Six Probe Panel
\$180

Slides

3



Coverslips

6



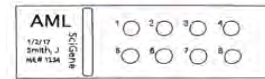
Rubber
Cement



MicroFISH System
\$36

Slide

1



Coverslip

1



MicroFISH[®] System Economics

Saves Typical Lab > \$225,000 Annual Probe Cost

Typical Lab Method	Annual Probe Cost
200 hybs/week x 5 μ l probe X \$6/ μ l probe (x 52 wks)	\$312,000

MicroFISH Method	Annual Probe + Slide Cost
200 hybs/week x 1 μ l probe X \$6/ μ l probe (x 52 wks)	\$83,200



Net Annual Savings:

\$228,800

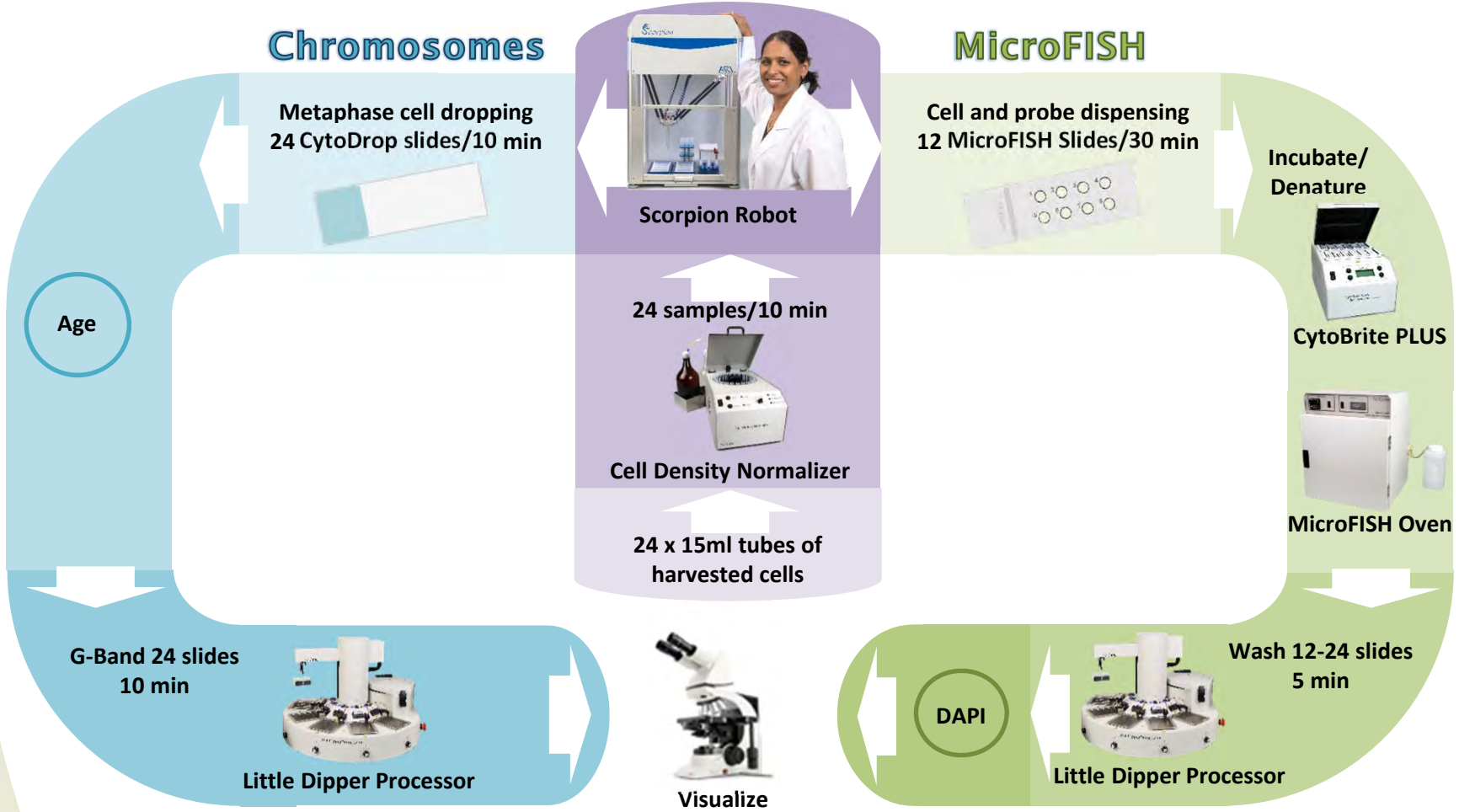
Labor and Probe Annual Savings Summary

Saves Typical Lab >1700 Labor Hours and >\$225K in Probe

Annual Technician Labor Hours	Manual / Current	Automated / SciGene
Chromosome slide preparation	900 hrs	90 hrs
FISH slide preparation	433	14
Post-hybridization	260	22
G-Banding	360	90
Total hours:	1953	216
Annual Labor Savings:		1737 hours

Annual FISH Probes	Typical Method	Automated / SciGene
FISH probes and slides	\$312,000	\$83,200
Annual Probe Savings:		\$228,800

Automating the Cytogenetics Laboratory



Request A Demo



**See Gary Henderson to schedule an
in-lab demonstration using your
own cell samples and probes.**

SciGene

Automating Cytogenetics