



DELTA
LIFE SCIENCE

inQuiQ[®]

label-free, multiplexed
biosensing



www.deltalifescience.nl

Introducing Delta Life Science

Founded in 2018 as a spin-off from TNO (Dutch organisation for applied scientific research), Delta is located at the heart of innovation in the Rotterdam Science Tower. At Delta we have developed an innovative biosensing technology: Nanophotonic Evanescent field Sensing (NES). This technology accelerates the development of diagnostic assays and drug discovery by making label-free multiplexed biosensing accessible to all.



ASSAY DEVELOPERS



ACADEMIC RESEARCHERS



PHARMA SCIENTISTS

NES Technology

Our biosensing technology uses photonic integrated circuits for label-free detection of biomolecular interactions with high sensitivity. This novel approach gives the possibility to fit multiple sensors on one chip (figure 1 A), enabling the analysis of multiple interactions from a single sample.

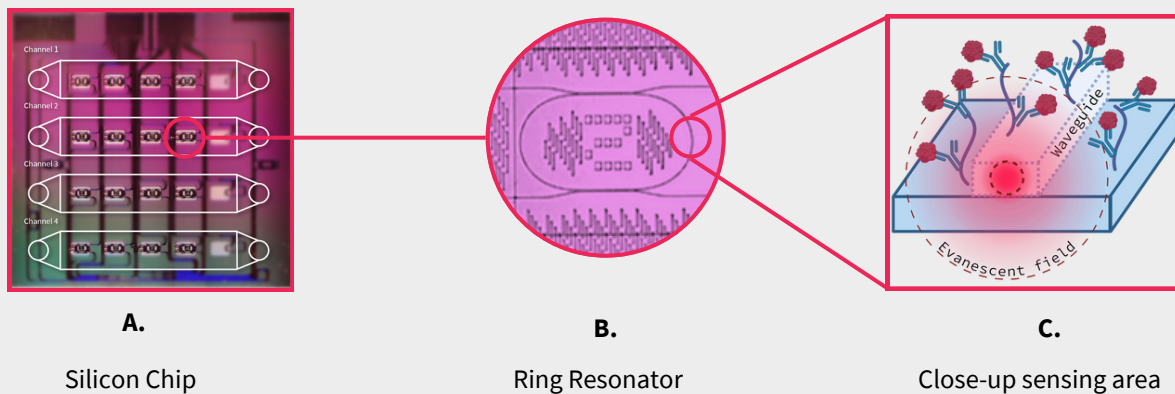


Figure 1. Illustration of the working principle of NES label-free biosensing technology.

(A.) The photonic chip with four channels, each of which contains an array of four ring resonators/sensors. **(B.)** These sensors are engineered to detect the presence of biomolecules without the need for any labels or markers. **(C.)** A close-up view of the waveguide guiding light through the chip, with the evanescent field extending just beyond the waveguide surface. Biomolecules interacting within this evanescent field affect the refractive index, resulting in measurable changes in the light speed.



HIGHER SENSITIVITY



3x FASTER ASSAY DEVELOPMENT



4x FASTER RESEARCH

With Delta's NES technology at its core, the inQuiQ[®] instrument is set to transform the landscape of biosensing. The inQuiQ[®] allows scientists to conduct highly sensitive, multiplexed analyses with ease.

inQuiQ[®] OFFERS



Figure 2. inQuiQ[®] instrument.

- **Compact design:** the use of NES technology enables sophisticated analyses taking up limited space (30 x 40 cm) on your lab bench
- **Wide range of sample volumes:** supports sample volumes from 25 μ L to 2 mL for diverse experimental needs
- **Cost-effective solution:** a premium instrument at an affordable price without compromising on performance

- **16-plex measurements:** obtain more data points from a small sample on a reusable sensor
- **Complex matrices:** improved measurements in serum, plasma, and supernatant samples due to the combination of a silicon chip and polycarboxylate hydrogel
- **Real-time data:** immediate results through label-free biosensing

“ The maximum sample volume that can be drawn from mice is about 100 microliters. For our research, we need to maximize what we can measure from these small samples. The highly multiplexed detection technology which is able to measure many different biomolecular interactions simultaneously using minimal sample volumes, is therefore essential for us. ”

- Prof. Dr. F. Grosveld
Erasmus MC / Harbour Antibodies

Versatile applications of the inQuiQ®

The inQuiQ® instrument is designed for customisable assays throughout the field of life sciences. Its advanced NES technology enables highly sensitive and multiplexed analyses, making it a valuable tool for various applications.

IDENTIFY DISEASE BIOMARKERS IN MULTIPLEX:

Identify multiple disease biomarkers efficiently by analysing small amounts of patient serum samples, accelerating discovery of diagnostics for earlier detection and improved outcomes.

GPCR-SMALL MOLECULE INTERACTIONS:

Screen small molecules against multiple GPCR variants in parallel, providing detailed kinetic profiles and identifying compounds with the best affinity and specificity.

MONOCLONAL ANTIBODY SCREENING:

Enhance antibody development with inQuiQ®, screening novel antibodies for specificity, affinity, and cross-reactivity, while regenerable sensors ensure cost efficiency.

DNA REPAIR PROTEIN INTERACTIONS:

Explore the mechanisms of DNA repair by analysing interactions between DNA repair proteins and damaged DNA sequences. Simultaneously mapping binding kinetics and key regulatory elements for potential gene therapies.

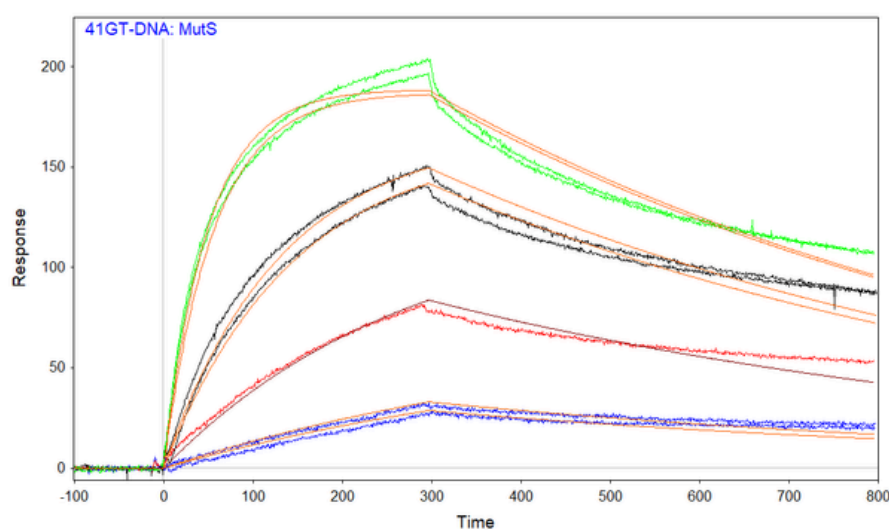


Figure 3. Multi-cycle kinetic experiment of mismatch DNA repair protein (Mutator S) binding to the 41GT oligonucleotide. The smooth straight lines are the fitting over the measured curves (From bottom to top 25, 50, 100, 200 nM).

HOW MUCH?

- Concentration measurements
- Biological active concentration

HOW SPECIFIC?

- Yes/ No data
- Epitope binning
- Design of affinity pairs
- Isotyping
- Ligand fishing
- Buffer formulation
- Multi-site binding analysis

HOW STRONG?

- Equilibrium analysis
- Equilibrium dissociation constant (K_D)
- Relative ranking of analytes
- Affinity plot
- Weak and strong interactions

HOW FAST?

- Kinetic rate analysis
- Association and dissociation
- $k_d / k_a = K_D$

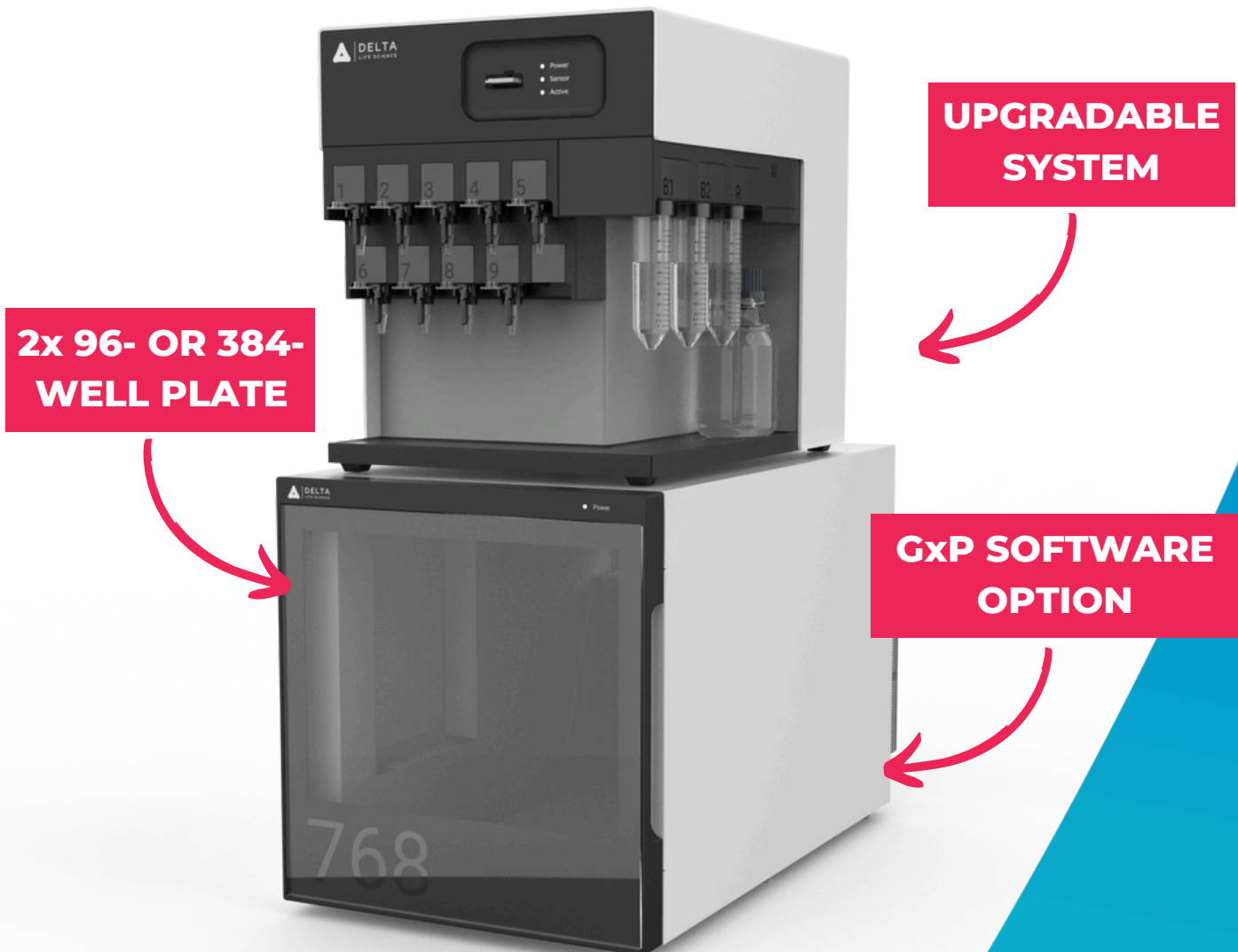


We see great use in the fact that the technology combines high-sensitivity label-free detection with the ability to multiplex. This is important not only for high throughput kinetic screening, but also for antibody lead candidate screening, for which now typically less quantitative ELISA's are used.

- Michael Schraeml, PhD, Roche Diagnostics

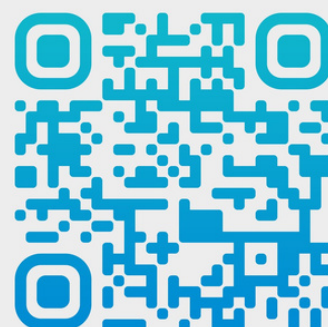
inQuiQ[®] 768 **INCREASE YOUR THROUGHPUT**

Is the inQuiQ[®] a perfect addition to your lab, but your need for throughput has increased? In 2025 Delta will launch its second instrument, the inQuiQ[®] 768. The add-on to the base model integrates an autosampler, enabling analysis of two 96- or 384-well plates in one run. Additionally, a GxP version of the software will be available, compliant with 21 CFR part 11 regulations.



Experience the inQuiQ[®]

Interested in seeing how the inQuiQ[®] can transform your research? Sign up for a session to see the instrument in action and learn more about its capabilities and benefits. Visit our website or scan the QR code to reserve your spot today!



Specifications

- Detection technology: Optical waveguides-NES
- Information provided: Kinetic and affinity data, quantitation
- Data presentation: Monitoring of real-time sensorgrams
- Injection volume range: 1 μ L – 2 mL
- Minimal sample volume: 25 μ L
- Flow rate range: 1 to 100 μ L/min
- Data collection rate: ~1.4 Hz
- Sample capacity: 10x 2 mL
- Running buffer capacity: 2x 50 mL
- Regeneration buffer capacity: 1x 50 mL
- Analysis temperature range: 13°C to 40°C
- Sample refractive index range: Unlimited
- Number of flow cells: 4 channels (4 sensor spots in each channel)

TYPICAL WORKING RANGES

- Association rate constant (k_a): up to $3 \times 10^6 \text{ M}^{-1} \text{ s}^{-1}$
- Dissociation rate constant (k_d): 10^{-5} to 0.1 s^{-1}
- Molecular weight detection: No lower limit for organic molecules
- Short term noise: Typically < 0.1 RU (RMS) or < 0.01 RU (RMS) with high-sensitivity sensors
- Baseline drift: Typically < 0.3 RU/min
- Immobilized interactant consumption: Typically 0.03 to 3 μ g/flow cell

INSTRUMENT DIMENSIONS

- W x H x D: 30 cm x 36 cm x 40 cm
- Net Weight Total: 18 kg

CHIP LAYOUT

The inQuiQ[®] chip has four flow channels connected in series with four sensors each, offering versatile experimental setup options.

These channels can be addressed individually, in pairs, in triplets, or all together, providing flexibility in experimental design.

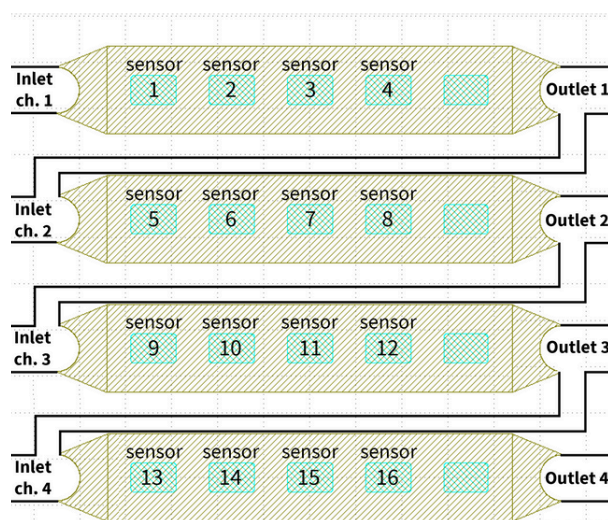


Figure 4. Flow channel layout of the inQuiQ[®] chip.

FUNCTIONAL LAYERS ON CHIPS

Our chips have three-dimensional hydrogels of different thicknesses (30nm and 1000nm) and densities (low, medium, and high).

Specific functionalisations can be offered:

- Protein A/G
- Carboxyl groups for amine coupling
- Azide groups for click chemistry
- Streptavidin/Neutravidin
- Biotin
- Lipophilic surface
- And more

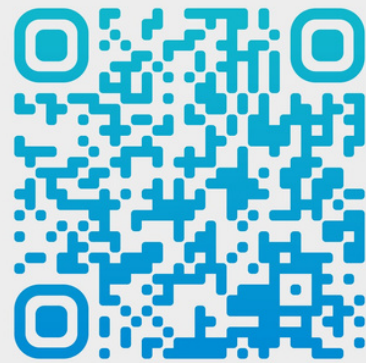
USE-CASES

- Biomolecule Kinetics & Affinity
- Yes/No Binding
- Specificity
- Quantitation
- Epitope Mapping
- Competitive Assays

SAMPLE TYPES

From small molecule drug candidates to high molecular weight proteins, as well as DNA, RNA, peptides, polysaccharides, and virulent proteins in various sample matrices (e.g., in DMSO containing buffers, plasma, and serum).

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