

AVAC

Optical platform for the ultrasensitive multiplexed detection of biomarkers

High- throughput platform for laboratories, Life Sciences and R&D



mecwins

AVAC

Ultrasensitive Optical Platform



AVAC TECHNOLOGY: Biological Assay

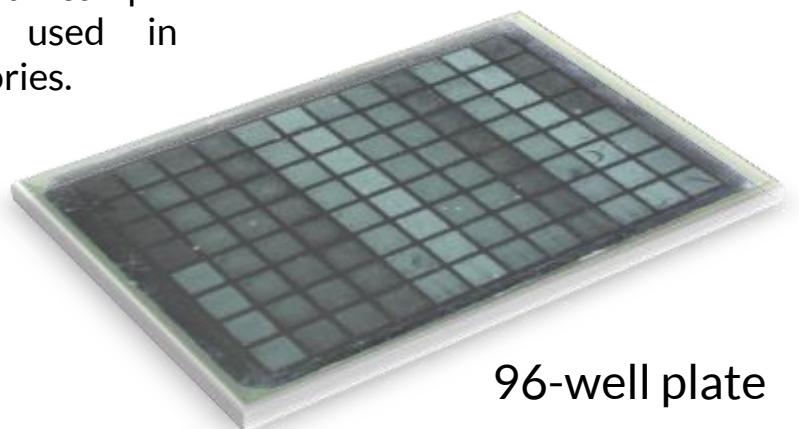
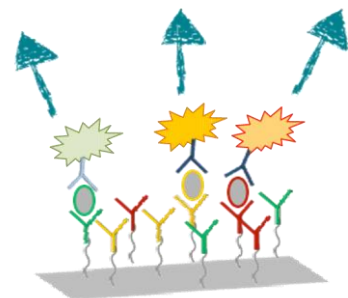
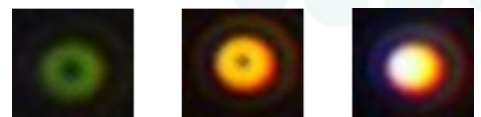
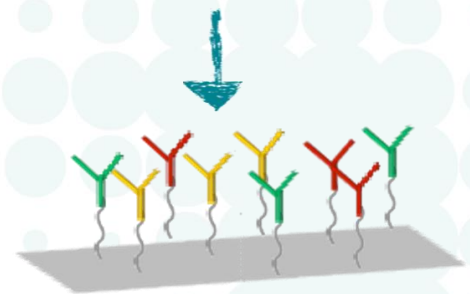
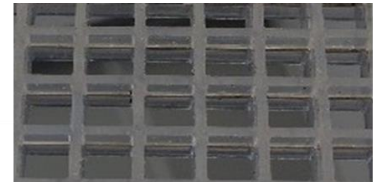
A biomarker is first recognized by a surface-anchored antibody, and then by an antibody in solution that identifies a free region of the captured biomarker. This second antibody is tethered to a gold nanoparticle that acts as a plasmonic label; the weak plasmonic signal from the nanoparticles is amplified by a multi-dielectric substrate (Patent US20170205405).

By using nanoparticles of different size and shape, it is possible to simultaneously detect different biomarkers in the same sample.

mecwins® has designed a disposable cartridge which consists of a multi-dielectric substrate with a size of 120x80 mm², combined with a removable 96-well silicone structure.

The dimensions of the cartridge were designed to be compatible with sample handling systems routinely used in hospitals and analytical laboratories.

Recently, a new cartridge with 16-well slide format has been developed.



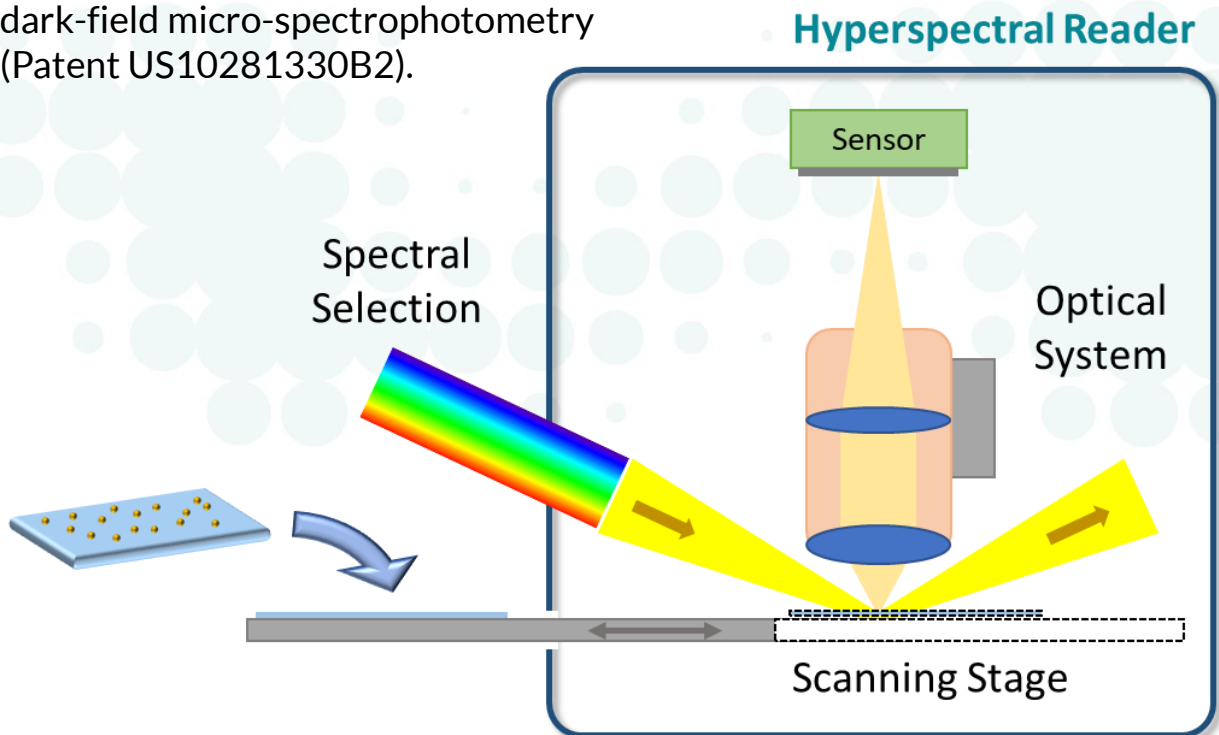
96-well plate

AVAC Ultrasensitive Optical Platform

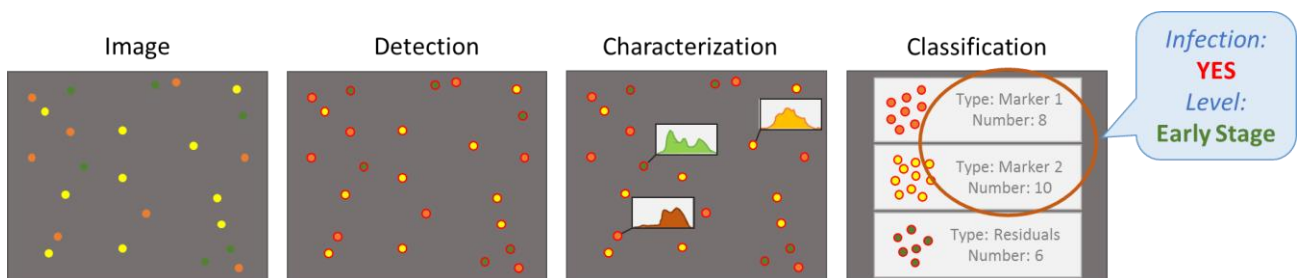


AVAC TECHNOLOGY: Optical Reader & Particle Counter

The plasmonic nanoparticles are optically detected by measuring the weak scattering signal with proprietary dark-field micro-spectrophotometry (Patent US10281330B2).



Single Particle Digital Counting



Since each plasmonic nanoparticle binds specifically to a biomarker of interest, it is possible to quantify the amount of each biomarker immobilized on the substrate by classifying and counting the different nanoparticles (Patent pending).

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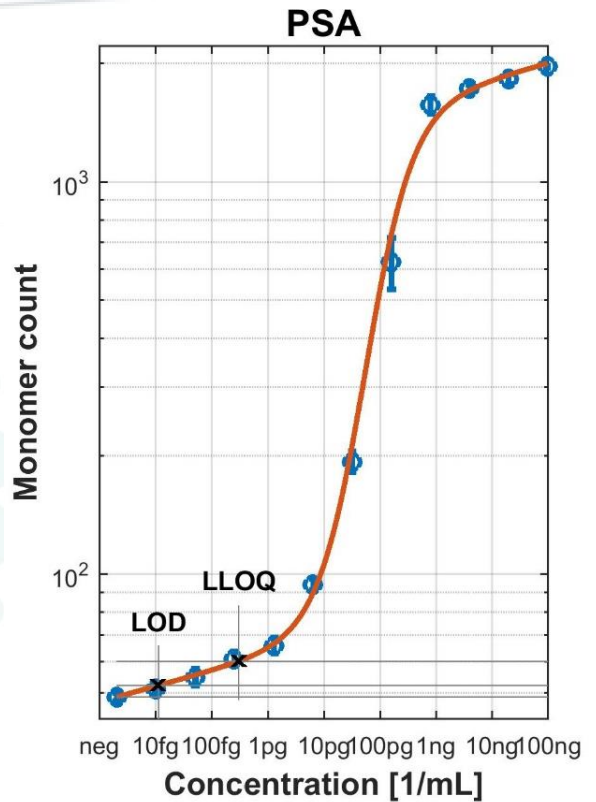
Ultrasensitive Optical Platform



AVAC TECHNOLOGY: Performance

High sensitivity has been demonstrated for several biomarkers:

- Oncology:
 - PSA, biomarker for prostate cancer recurrence detection
 - CYFRA21-1
- Cardiac diseases:
 - Troponin I, biomarker of reference for Myocardial Infarction
- Infectious diseases:
 - p24, biomarker for HIV detection
 - Interleukin biomarkers (IL-10, IL-6, TNF- α , INF- γ)
 - PCT, biomarker for sepsis detection



Mecwins Total PSA Immunoassay	
LOD*	11,3 fg/mL
LLOQ*	308 fg/mL
CV	< 5%

* LOD: neg. control + 3 σ , LLOQ: neg. control + 10 σ

AVAC Technical Specifications

Spatial resolution	0.7 μ m (diffraction-limited)
Reading/Analysis Speed	Up to 20,000 images per hour
Throughput	96 samples in less than 5 minutes
Multiplexing Capability	Up to 5 biomarkers
User Interface	Integrated 15" touch screen
Computer	Fully-integrated high-performance computer
Weight	95 Kg
Dimensions (H x D x W):	750 mm x 735 mm x 520 mm

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