MISSIONE 4
ISTRUZIONE
RICERCA

Finanziato dall'Unione europea
NextGenerationEU

Ministero dell'Università e della Ricerca

Italiadomani
PIANO NAZIONALE DI RIPRESA E RESILIENZA

VITALITY

Multi-Fluorescence Nanoparticle Tracking Assay

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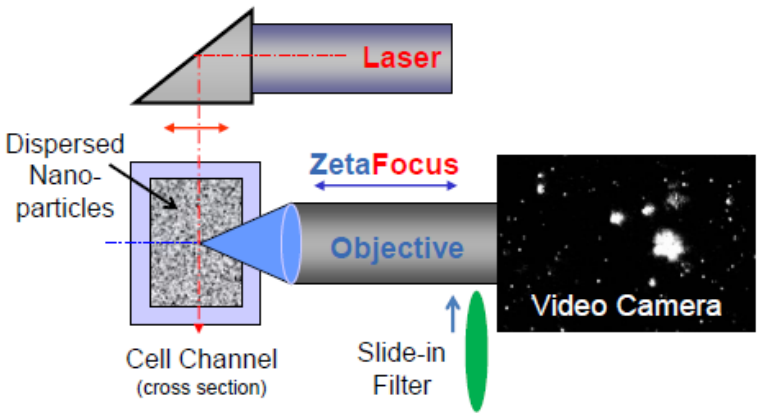
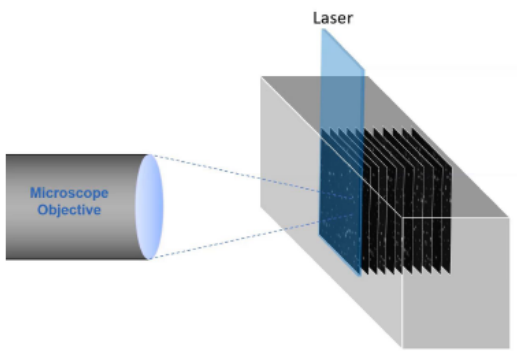
COSMOB TECHNOLOGICAL CENTER

MECCANO

- Size
- Concentration
- Zeta Potential
- Fluorescence
- Colocalization





PARTICLE METRIX

- **Automated measurement of 11 or more positions per sample**
- **Representative sample result with high statistical power**

Size Measurement

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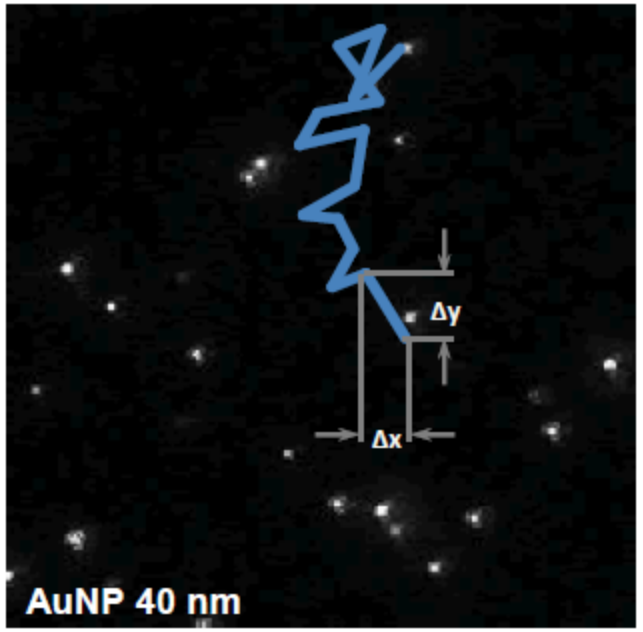

Stokes-Einstein equation:

$$D = \frac{k_B T}{6\pi\eta r}$$

D = Diffusion coefficient [m^2/s]
k_B = Boltzmann constant
T = Temperature

η = Viscosity
r = Particle radius

⇨ **Size is calculated by the measurement of the Brownian Motion**

Concentration Measurement

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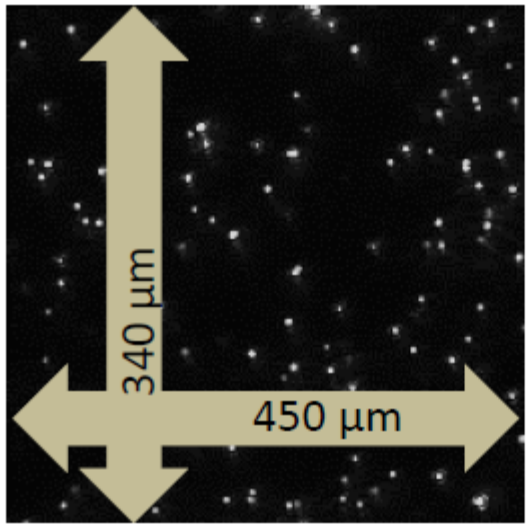

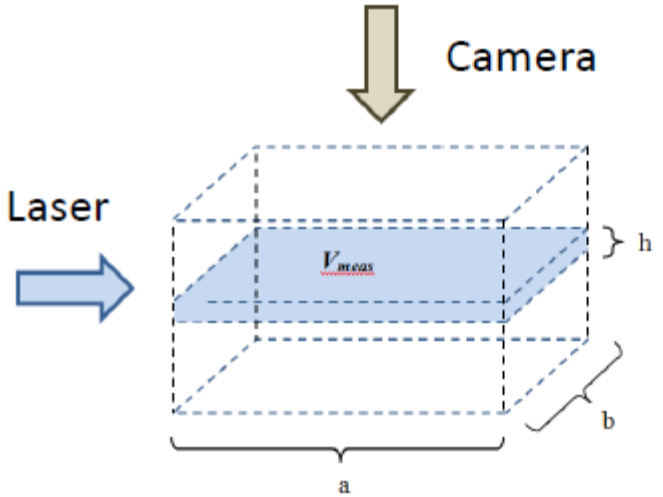

Measurement volume: ~ 3nl/position

Zeta Potential Measurement

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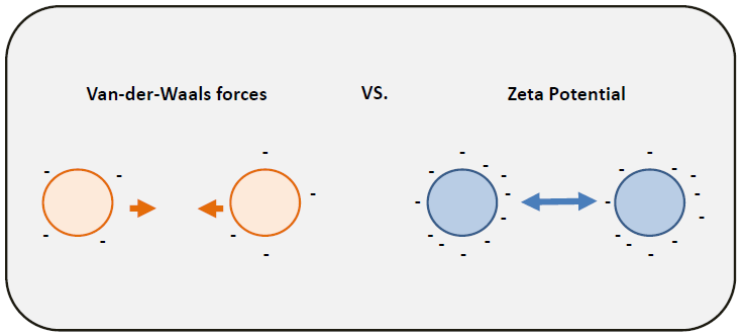

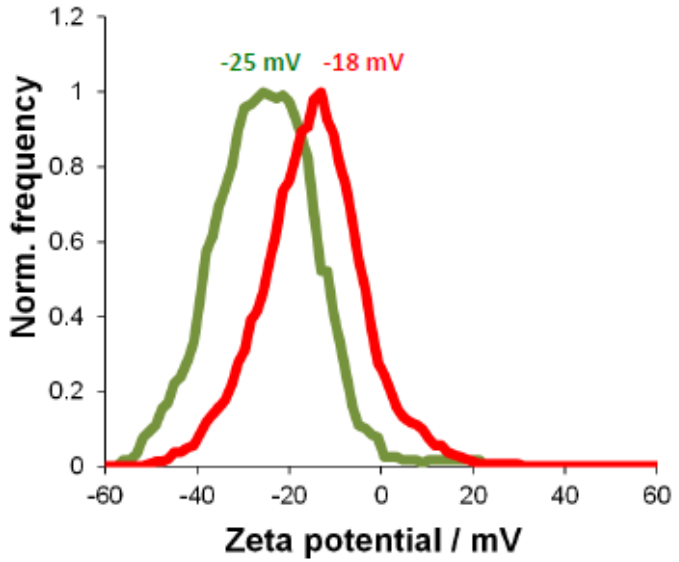

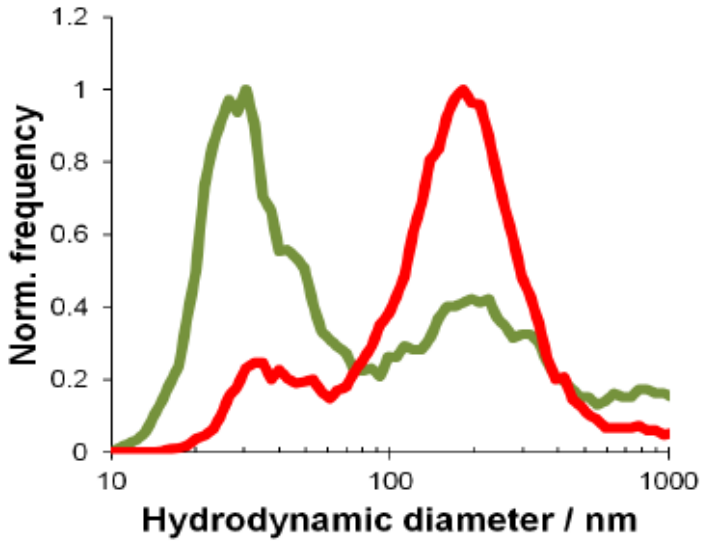

Zeta Potential can be used as a quality criteria

Zeta Potential Measurement

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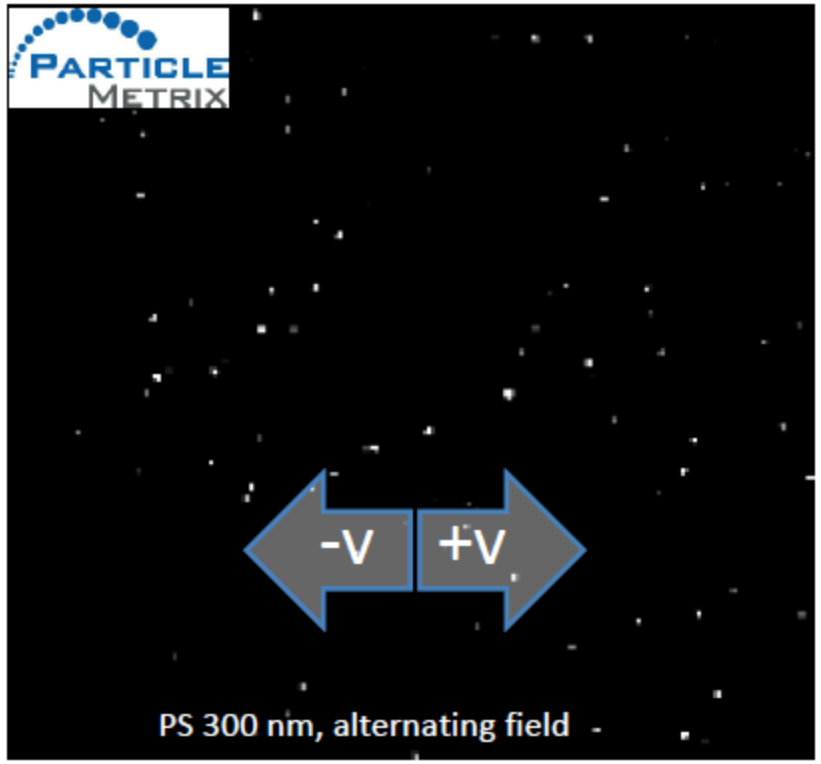

Helmholtz-Smoluchowski equation:

$$\zeta = \frac{4\pi\eta}{\varepsilon} f(\kappa a) \cdot \mu_e$$

ε = Dielectric constant
η = Viscosity of medium
$f(\kappa a)$ = Debye function

ζ = Zeta potential
μ_e=Electrophoretic mobility

Zeta Potential is calculated by the measurement of the movement of the particles in a electrical field

Resolution and Scatter plots

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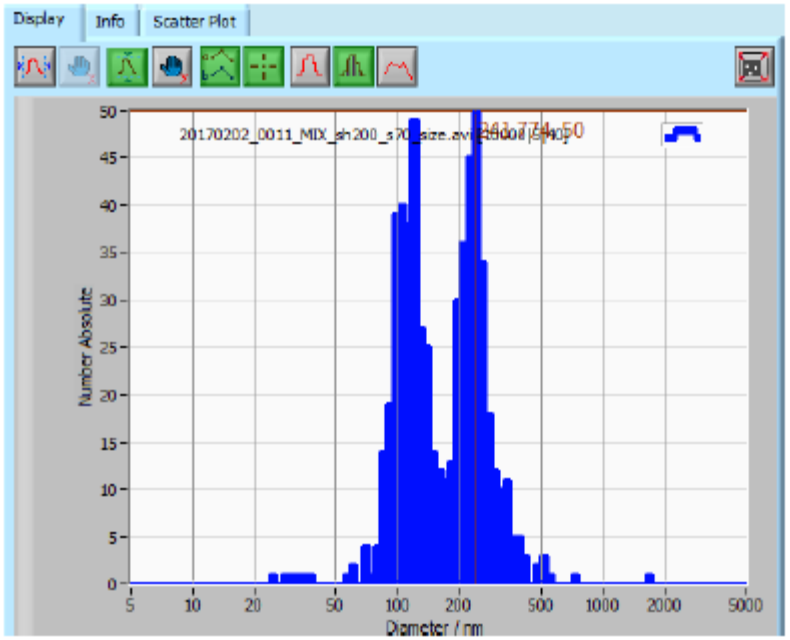

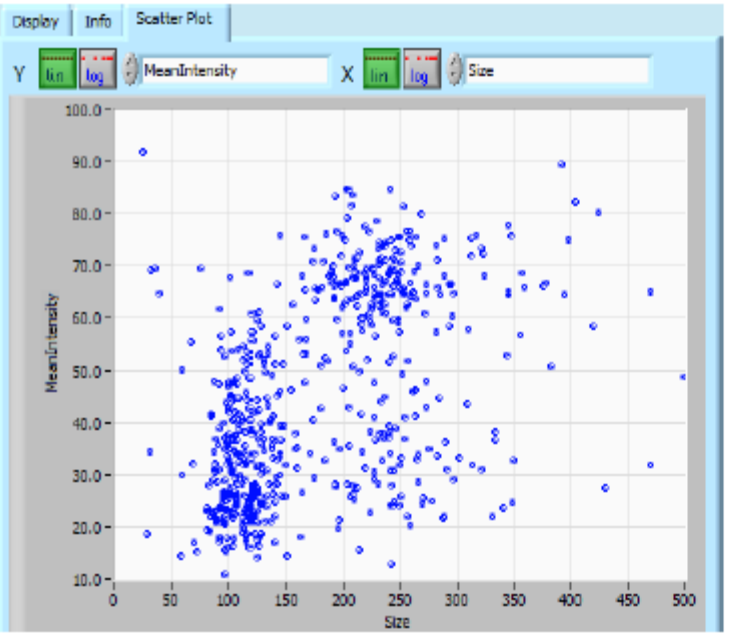

Multiple Variables

- Intensity
- Area
- Shape
- Trajectory data
- …

ZetaView Mono laser NTA – Membrane staining of EVs

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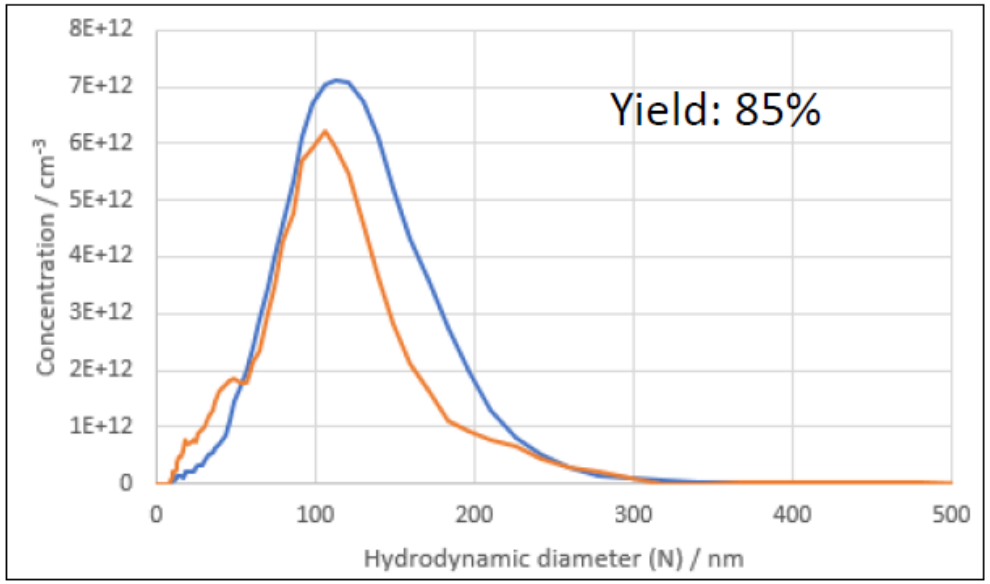

Scatter

Fluorescence

Colocalization NTA

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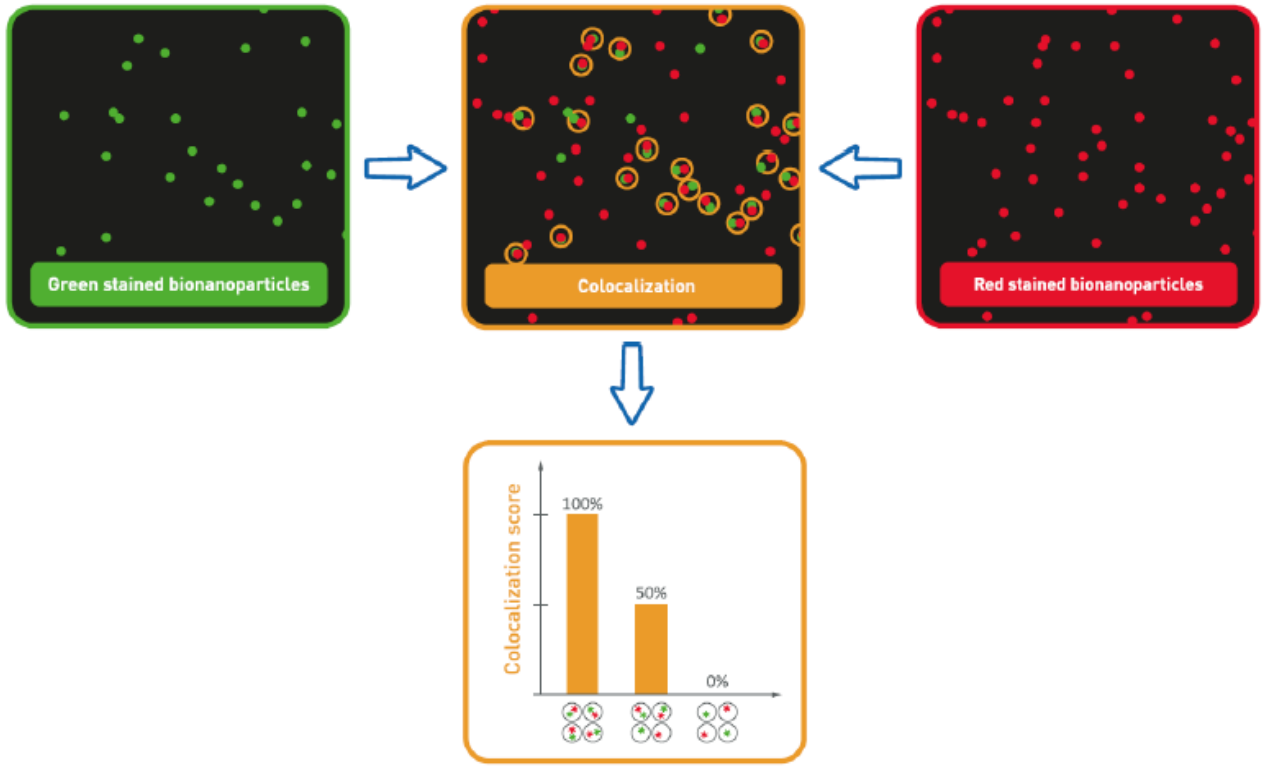

Colocalization with fluorescent-NTA

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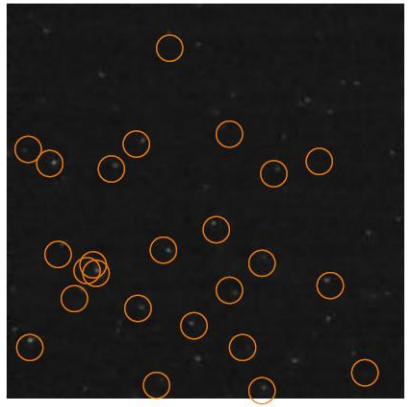
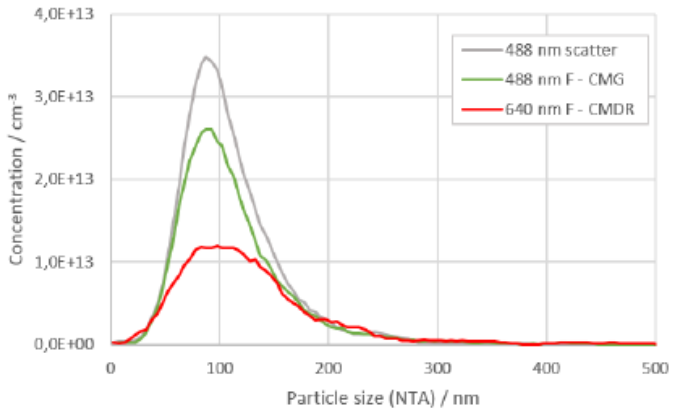
double stained **liposomes**

CMG CMDR

Membrane dye





Colocalizaton ratio about 75%

red + green positve

Typical applications of the ZetaView®

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- ✓ Bionanoparticles
- ✓ F-labeled bioNP
- ✓ Liposomes + Micelles
- ✓ Drug delivery
- ✓ Proteine agglomeration
- ✓ Virus like particles (VLP)
- ✓ Virus samples / Viral titer
- ✓ Extracellular vesicles (EV)
- ✓ Emulsions
- ✓ Polymers
- ✓ Nanometals
- ✓ Nanobubbles
- ✓ Irregular particles
- ✓ Quantum dots