

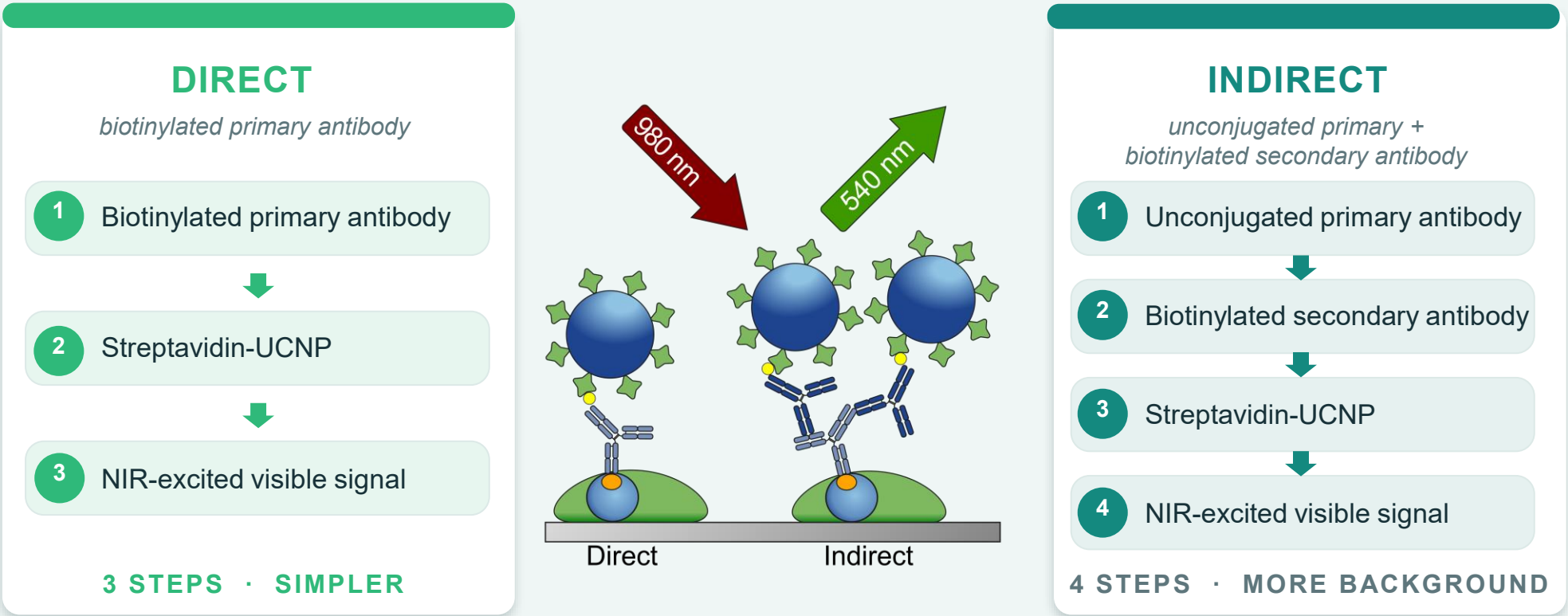
Performance of Direct and Indirect Biomarker Labelling Using Upconverting Nanoparticles

M. J. Mickert, K. Berggren, E. Kuteeva, M. Helgstrand, M. Malmqvist, S. Wallenborg
Lumito AB, Lund, Sweden · Atlas Antibodies AB, Stockholm, Sweden

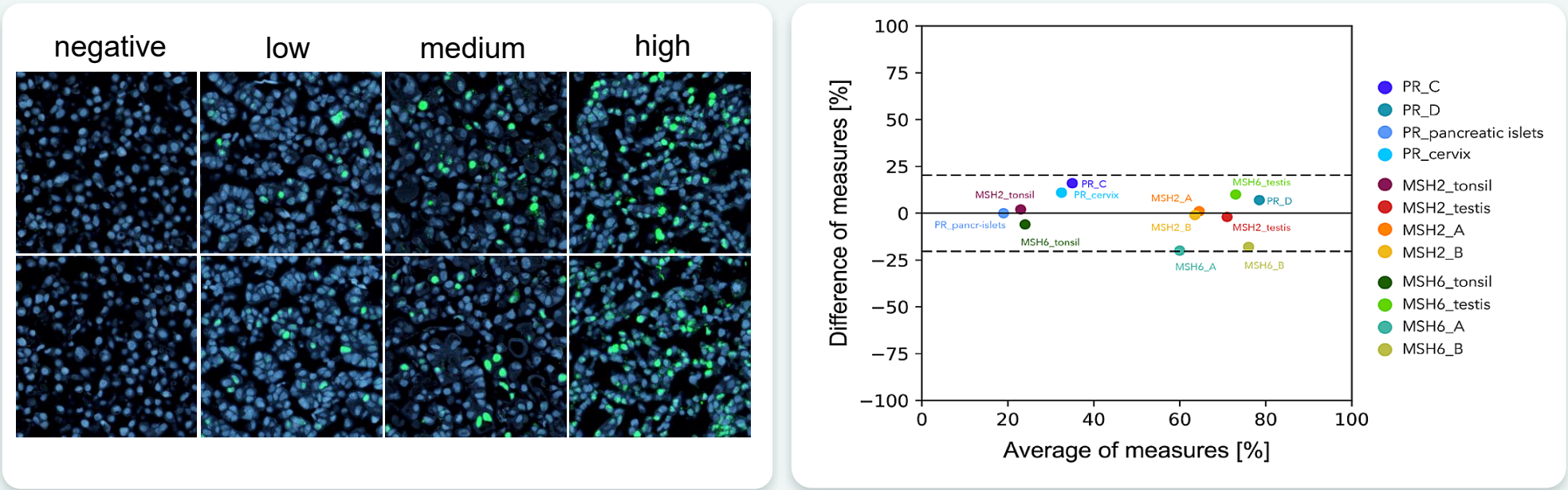
BACKGROUND & AIM

Upconverting Nanoparticles (UCNPs) are novel luminescent labels that emit visible light upon excitation with near-infrared (NIR) light. NIR excitation eliminates tissue autofluorescence, enabling super-sensitive detection of UCNP labels down to a single particle.
Indirect immunohistochemistry amplifies signal but adds steps and background. **Direct labelling** provides a simpler workflow without amplification. We compared both methods using validated antibodies and the UCNP-based **SCIZYS** platform.

METHOD · same antibody, two detection routes



RESULTS · matched performance, simpler assay



PR labelling — direct (top) vs indirect (bottom)
Matched positive nuclei across the dynamic range.

Bland–Altman agreement across tissues
Points cluster on the zero line — methods agree.

0.89

ICC AGREEMENT

10.4%

MEAN BIAS

976 nm

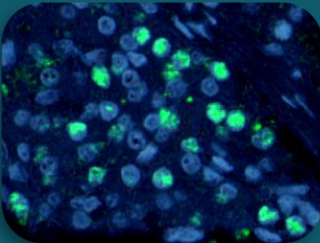
NIR EXCITATION

Zero

AUTOFLUORESCENCE

CONCLUSION

Direct labelling matches the quantitative performance of indirect detection while cutting assay steps and background — a simpler route to positive cell quantification with UCNPs.



SCIZYS Erbium-SA reagent kit · SCIZYS S1 whole-slide scanner · For research use only. (Lumito)
Anti-PR AMAb91529 · Anti-MSH2 AMAb91892 · Anti-MSH6 AMAb91903 (Atlas Antibodies)
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