Electronic Supplementary Information

Surface-enhanced Raman spectroscopy (SERS) characterisation of abasic sites in DNA duplexes

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Experimental methods

Materials. All materials were of the highest purity available and obtained from Sigma-Aldrich and Fisher Scientific. DNA oligonucleotides were purchased from Eurofins Genomics and Life Technologies. Stock solutions (400 µM) of each strand were prepared in Milli-Q water. Subsequent hybridization was conducted by heating to 90º C for 10 minutes an equimolar solution (20 µM) of complementary strands in PBS 1 M (pH 7.4). The solution was then slowly cooled down to room temperature.

Synthesis of silver colloids and SERS measurements. Positively-charged spermine coated-silver nanoparticles (AgSp) were synthesized as previously illustrated.[1-3] Nanoparticles of ca. 22 nm and a localized surface plasmon resonance centered at ca. 391 cm^{-1} are obtained, displaying a positive ζ-potential of ca. + 40 mV. For SERS measurements, 8 µL of a 4 µM solution of the duplex in PBS 0.1 M were added to 140 µL of AgSp colloids. Samples were left to equilibrate for 2 hours and quickly sonicated before performing the SERS measurements. SERS measurements of the homopolymeric strand ssG were performed by adding an aliquot of a ssG solution submitted to thermal treatment (60ºC, 10 min).

Instrumentation. SERS spectra were acquired using a Renishaw InVia Reflex confocal microscope equipped with a high-resolution grating consisting of 1800 grooves/cm for visible wavelengths, additional band-pass filter optics, and a CCD camera. A 514 nm laser was focused onto the sample by a lens for macrosampling (30 mm focal length, 0.17 NA). SERS spectra were acquired with 5×10 s exposure time and 6 accumulations. UV-vis spectra were obtained using a Thermo Scientific Evolution 201 UV-visible spectrophotometer.

ssA = AAA AAA AAA AAA AAA AAA AAA

ssC = CCC CCC CCC CCC CCC CCC CCC

ssT = TTT TTT TTT TTT TTT TTT TTT

ssG = GGG GGG GGG GGG GGG GGG GGG

dsCG = CCG CGC CGC GCG CGC GGC GCGG
GGC GCG GCG CGC GCG CCG CGCC

dsAT = AAT ATA ATA TAT ATA TTA TATT
TTA TAT TAT ATA TAT AAT ATAA

Figure S1. Sequences of the reference DNA samples.

References

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