Supporting Information

DNA Damage by Low-Energy Electron Impact: Dependence on Guanine Content

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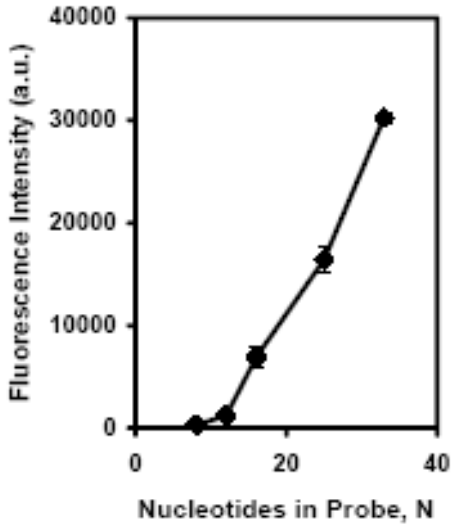

Hybridisation efficiency of 5´-SH-C6-$(dT)_N$ oligonucleotides immobilized on gold with the 3´-$(dA)_{33}$-Cy5 sequence.

Base-stacking calculated Tm (°C) of the oligonucleotides
(http://www.promega.com/biomath/calc11.htm)

T33	49
T25	44
T16	32
T12	21
T8	-2
AGA AAA AAA	8
AGA GAA AAA	11
AGA GAG AAA	13
AGA GAG AGA	16

Experimental

Self-assembled DNA monolayers were prepared by tethering the oligonucleotides at the thiolated 5´-end onto (12x12x1 mm) gold-coated glass chips (Arandee, Germany). Four or eight chips were processed in parallel during the deposition/hybridisation and washing steps. For the DNA immobilization the chips were positioned facing down in cavities machined precisely in a PCTFE (polychlortrifluorethylen) plate and exposed overnight to 10µM solution of DNA in 3x SSC (0.45 M sodium chloride and 0.045M sodium citrate, pH 7.0). The chips were then rinsed with ultra pure water (HPLC water, Merck) to remove excess DNA, followed by two washing steps in 3xSSC and 1xSSC for 5 minutes under shaking. Finally, the chips were rinsed with water to remove any excess salt left on the surface and drayed with nitrogen gas. Following this the chips we positioned in a carousel sample holder and transferred through a fast interlock adapter into UHV-chamber for the electron exposure. The electron beam was generated by a simple electron gun composed of a tungsten filament and four molybdenum electrodes. The electrons were guided along a homogeneous magnetic field generated by a pair of Helmholtz coils, thereby resulting in a well-defined electron beam at an energy resolution of about 0.5 eV. The incident electron-beam energy is defined by the voltage drop from the filament to the chip surface. The exposure of the chip surface to the electron beam was controlled by a shatter. Different samples were sequentially exposed to the electrons by rotating the holder and positioning every chip in front of a 2 mm diameter opening in a mask. The beam current was measured using a Keithley 6485 instrument and NI 6014 card and integrated by using Labview software. After the electron exposure the chips

were removed from the UHV chamber and hybridised overnight with 2µM solution in 3xSSC of the corresponding complementary strand (33-mer) labelled with Cy5-dye. This was followed with equivalent washing steps as described above.

Fluorescence images were obtained using confocal fluorescence scanner (Affymetrix 418 Array Scanner) and were evaluated with GenePixPro6.0 software. The RAIRS data were obtained using a Nicolet Magna 570 spectrometer equipped with external reflection accessory (85º grazing angle).