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Electronic Supplementary Information

Triplex-hybridizing bioconjugated gold nanoparticles for specific Y-chromosome sequence targeting of bull spermatozoa

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SequenceFinder 1.0

The software SequenceFinder 1.0 as well as a description how to use the software can be found online: https://www.uni-due.de/barcikowski/versch.htm

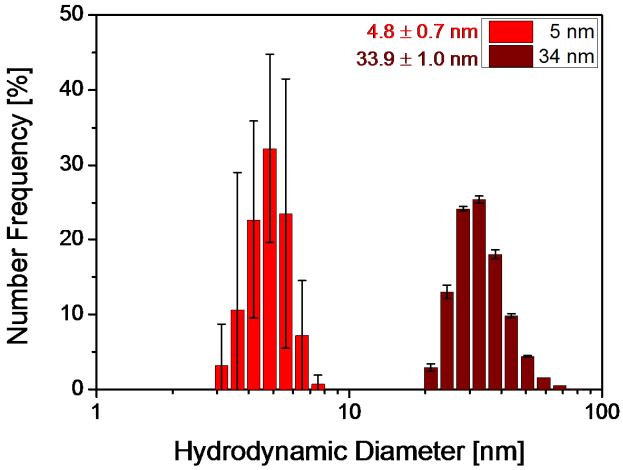

Figure S 1: Number weighted size distribution of 5 nm and 34 nm non-functionalized gold nanoparticles. 5 nm gold nanoparticles are prepared by laser ablation in liquid whereas 34 nm gold nanoparticles were bought at Nanopartz™.

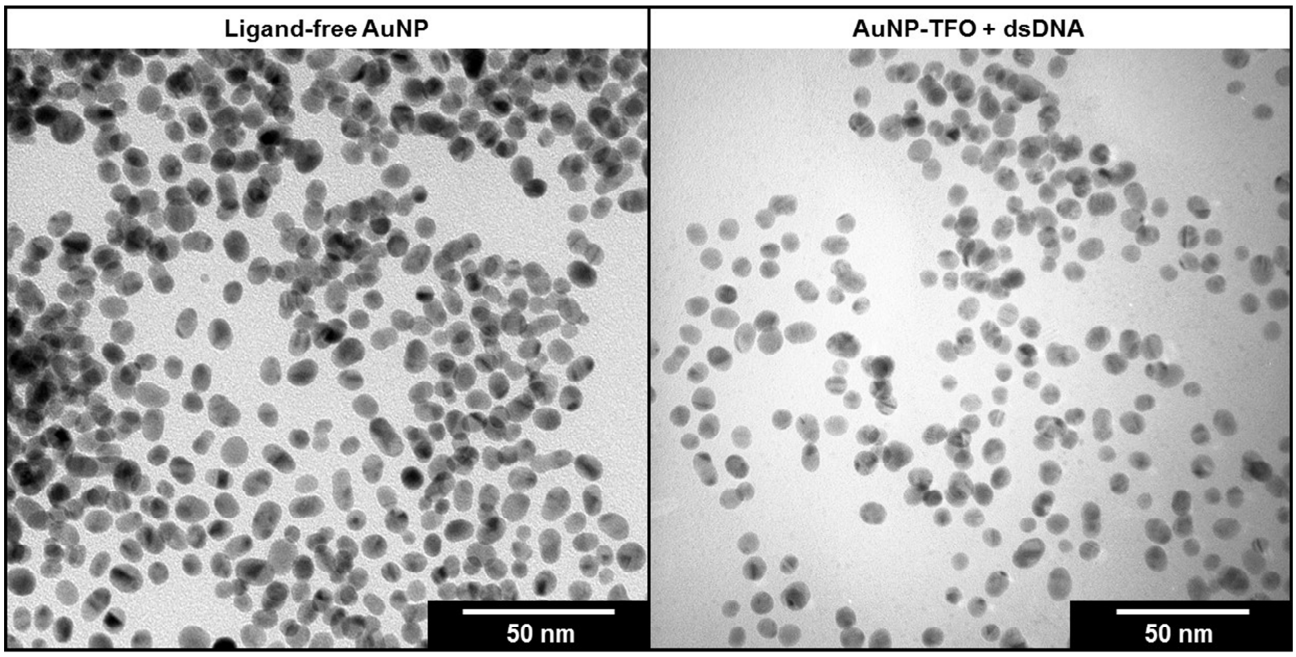

Figure S 2: TEM-picture of ligand-free Gold nanoparticles (left) and AuNP-TFO conjugates hybridized to dsDNA (right). These pictures show that the primary particle size of the nanoparticles does not change during hybridization.

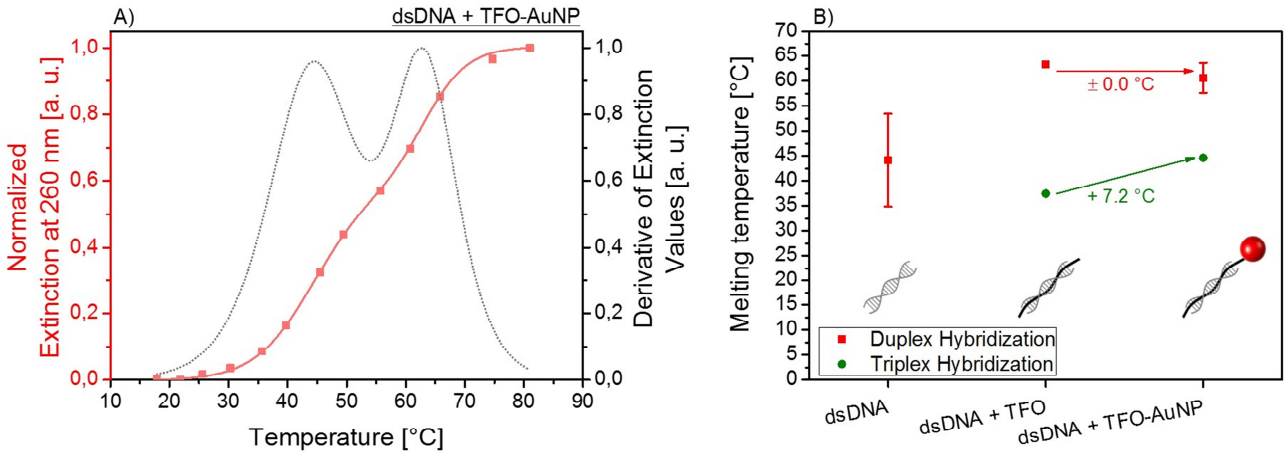

Figure S 3: Triplex hybridization of AuNP-TFO to synthetic DNA. A) Example of the deviation curve after performing a bi-sigmoidal fit of the melting curve data. B) Data from melting curve analysis showing the deviation in temperature by using gold nanoparticles coupled to the TFO with increased melting temperature during AuNP-TFO-dsDNA triplex hybridization.

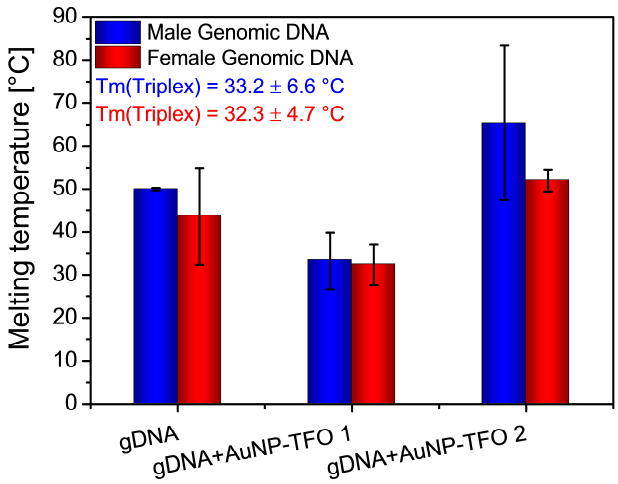

Figure S 4: Mean values of melting temperature of male and female gDNA hybridized to TFO-AuNP.

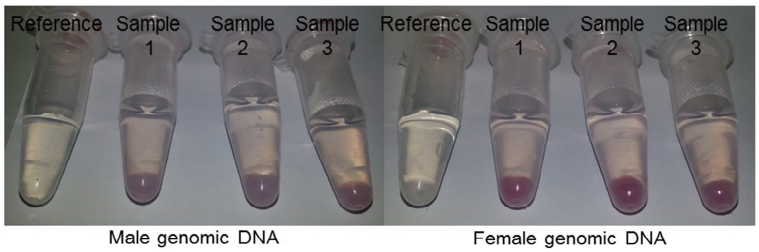

Figure S 5: Photograph of AuNP-TFO Conjugates hybridized to male and female genomic DNA.

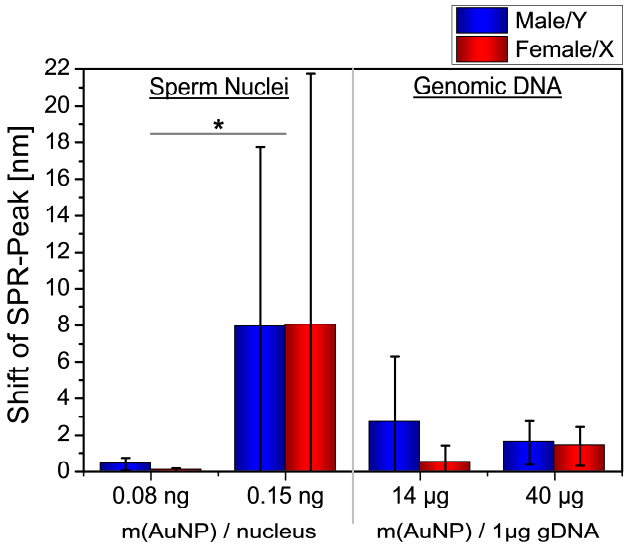

Figure S 6: Shift of surface plasmon resonance in dependence of the ratio of the nanoparticle mass per nucleus and per 1 µg gDNA. Significant results measured by ANOVA are depicted as asterisks.

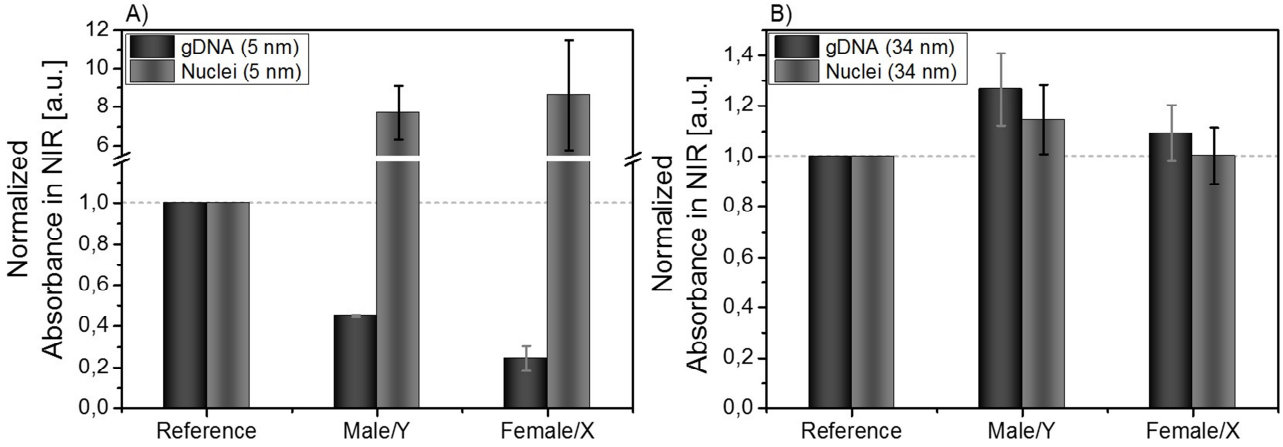

Figure S 7: Normalized absorbance data in NIR for 5 nm (A) and 34 nm (B) TFO-AuNP hybridized to gDNA and sperm Nuclei indicating that triplex hybridization works with biological samples and can be detected better with larger gold nanoparticles