Electronic Supplementary Information

Molecular diagnosis of α-thalassemias by the colorimetric nanogold

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3.3. Preparation of the nanogold SEA-probe

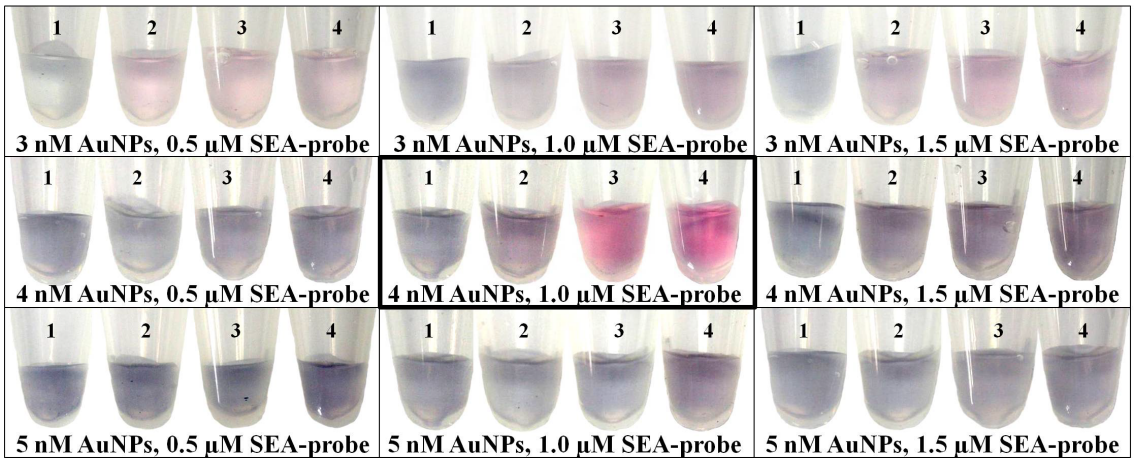
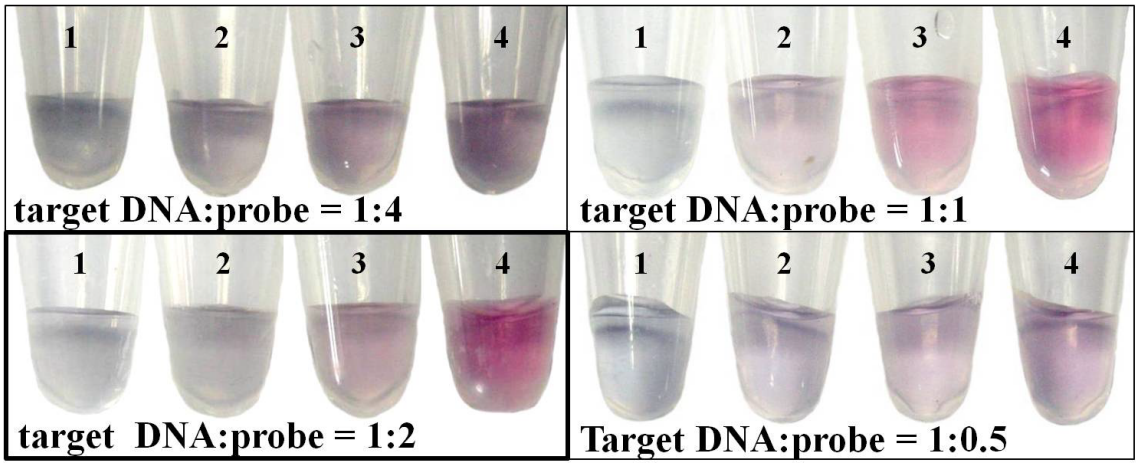


Fig. S1 Color changes of the nanogold SEA-probe in diagnosis of normal α-globin gene (2), α-thalassemia 1 (--^{SEA}/αα) carrier (3) and Hb Bart's hydrops fetalis (4) compared to control without DNA (1). The nanogold SEA-probe was prepared at various concentrations of AuNPs (3-5 nM) and SEA probe (0.5-1.5 µM).

3.4. Investigation the optimal conditions of using the nanogold SEA-probe

3.4.1 Assessment optimal volume ratio of target DNA and nanogold SEA-probe

(a)



(b)

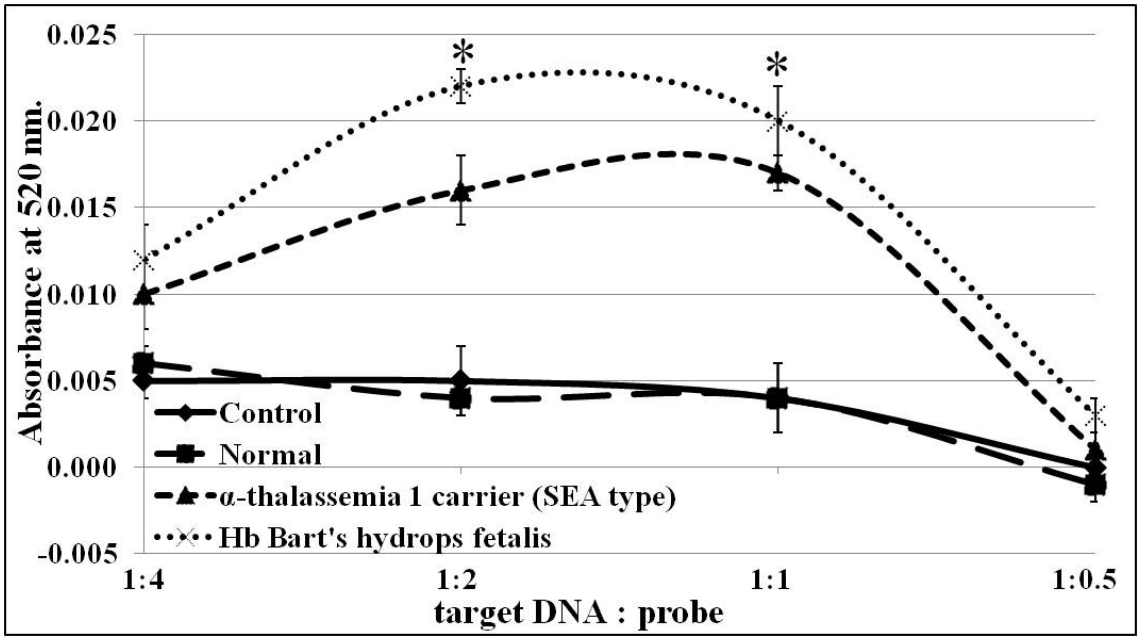
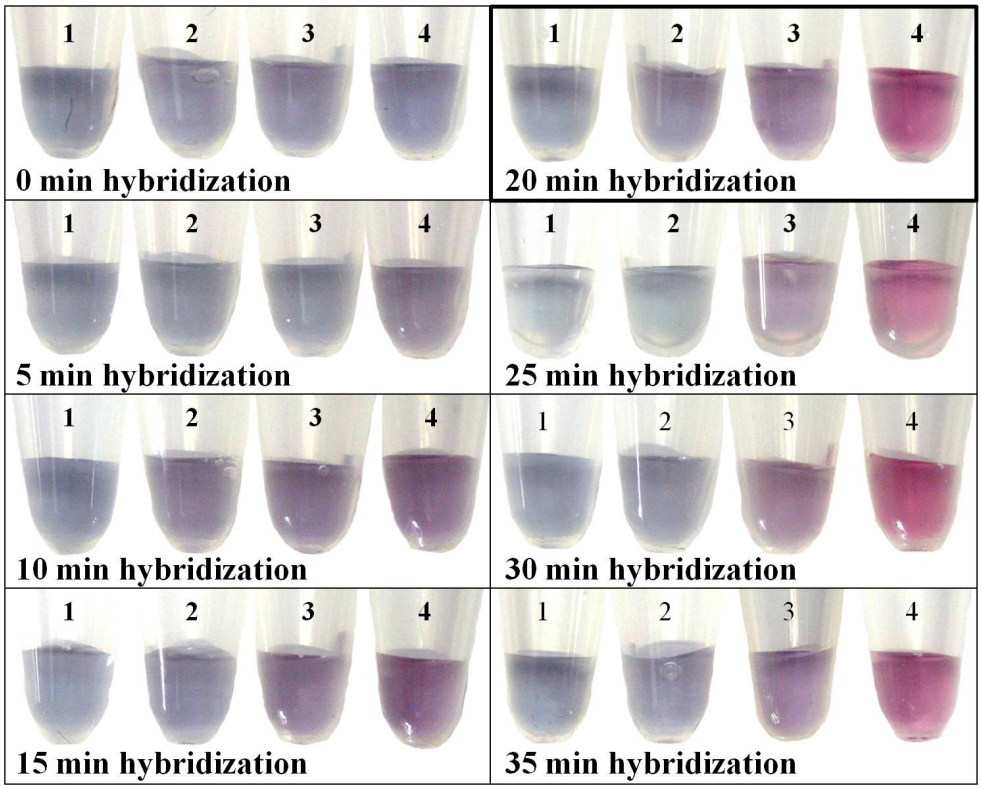


Fig. S2 Hybridization of the amplified target DNA and the nanogold SEA-probe at various volume ratios. The color changed was visualized by naked eyes (a) and absorption at 520 nm (b). Blood carrying normal α-globin gene (2) was identified from either α-thalassemia 1 carrier ($--^{SEA}/\alpha\alpha$) (3) or Hb Bart's hydrops fetalis (4) compared to control without target DNA (1). (* indicated statistically significant difference at p-value < 0.05).

3.4.2. Assessment optimal Hybridization time

(a)



(b)

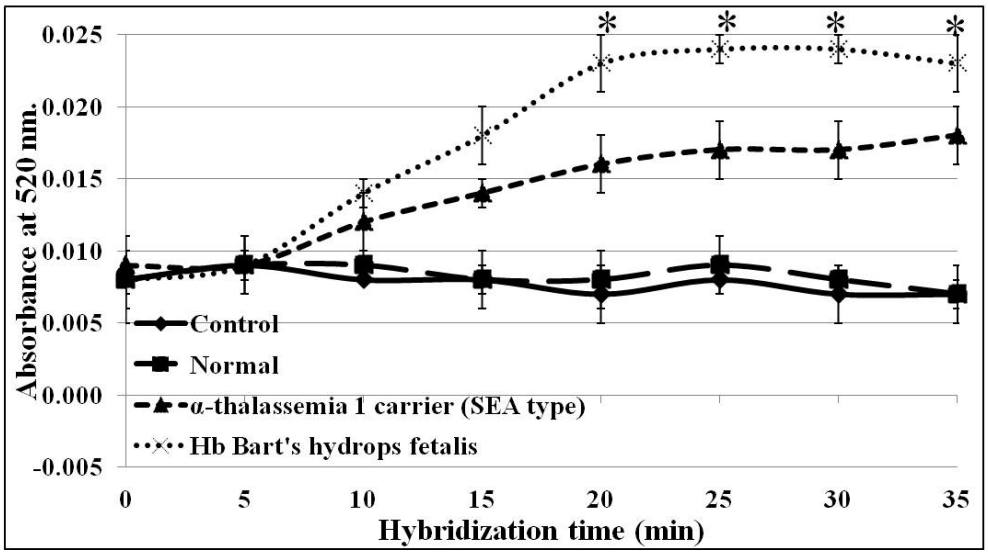
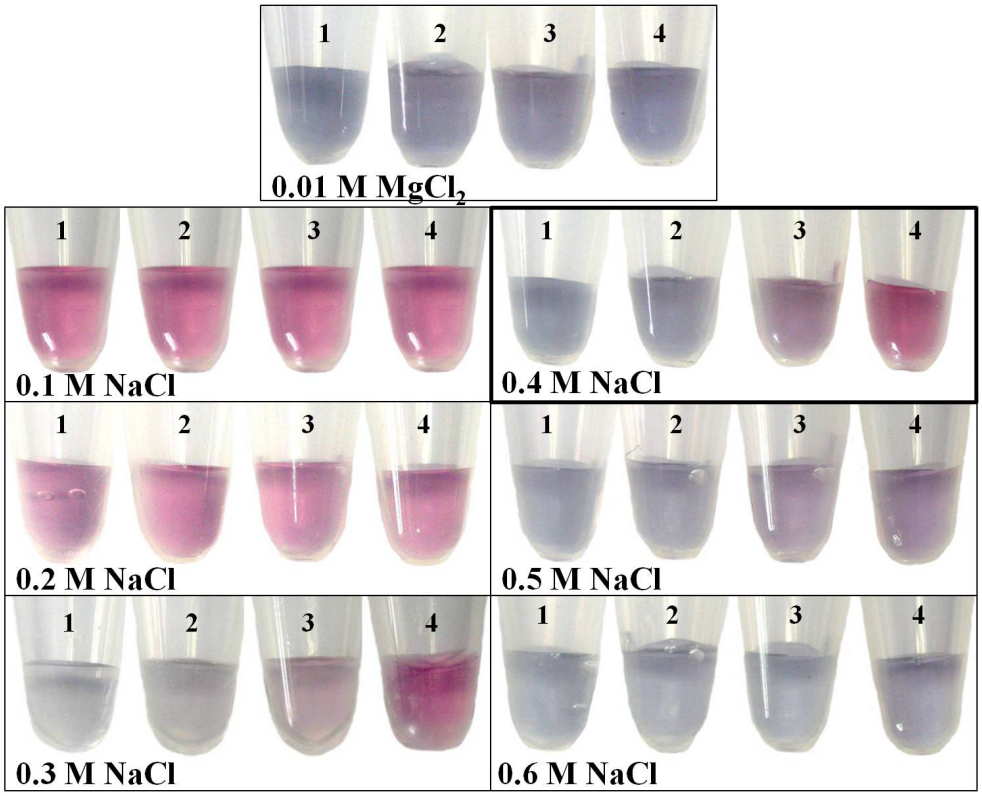


Fig. S3 Hybridization of the amplified target DNA and the nanogold SEA-probe at various time intervals. The color changed was visualized by naked eyes (a) and absorption at 520 nm (b). Blood carrying normal α-globin gene (2) was identified from either α-thalassemia 1 carrier ($--^{SEA}/\alpha\alpha$) (3) or Hb Bart's hydrops fetalis (4) compared to control without target DNA (1). (* indicated statistically significant difference at p-value < 0.05).

3.4.3. Assessment optimal salt concentration

(a)



(b)

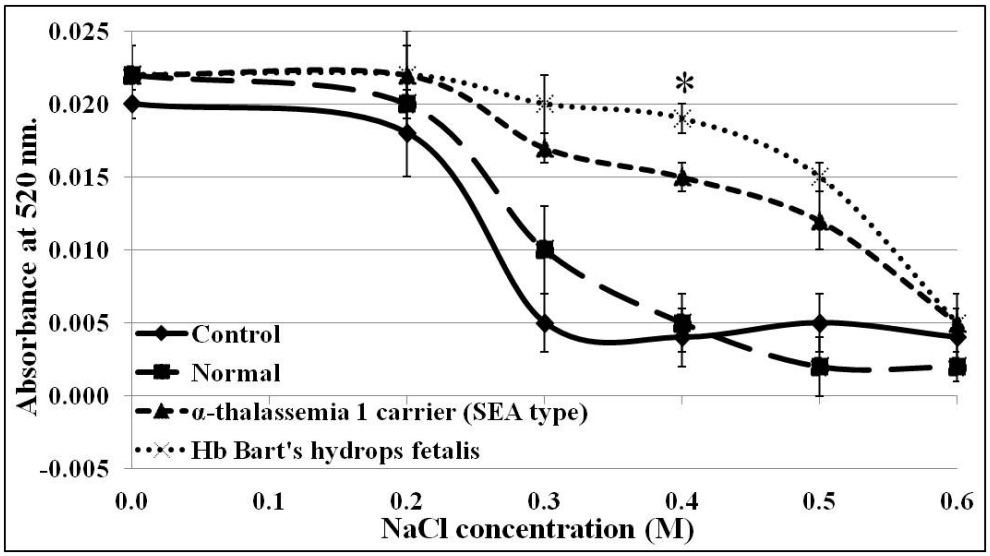
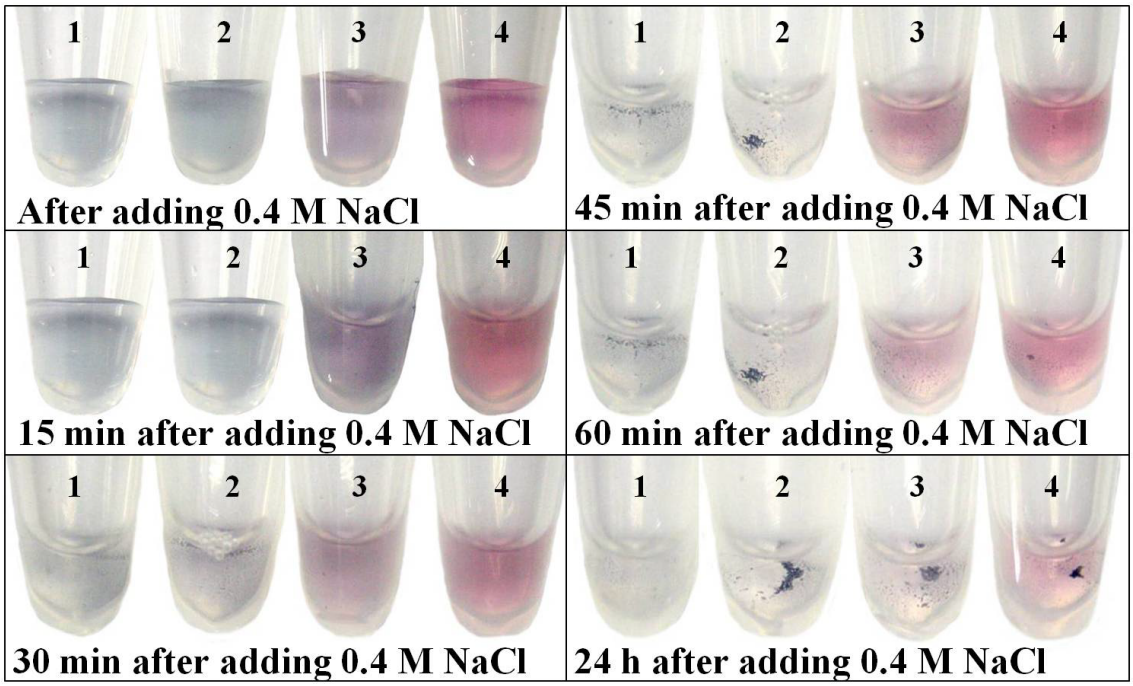


Fig. S4 Effect of salt concentration on aggregation of the un-hybridized nanogold SEA-probe. The color changed was visualized by naked eyes (a) and absorption at 520 nm (b). Blood carrying normal α-globin gene (2) was identified from either α-thalassemia 1 carrier (--^{SEA}/αα) (3) or Hb Bart's hydrops fetalis (4) compared to control without target DNA (1). (*indicated statistically significant difference at p-value < 0.05).

3.4.4. Assessment stability of color after salt addition

(a)



(b)

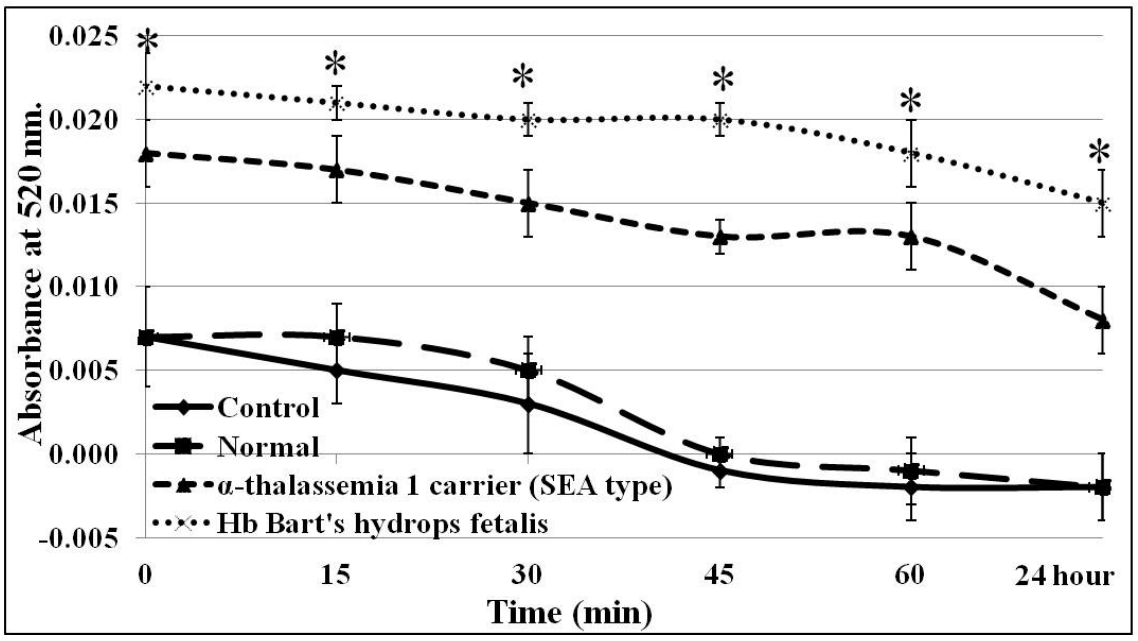


Fig. S5 Stability of color changed after salt induced aggregation of the un-hybridized nanogold SEA-probe. The color changed was visualized by naked eyes (a) and absorption at 520 nm (b). Blood carrying normal α-globin gene (2) was identified from either α-thalassemia 1 carrier ($--^{SEA}/\alpha\alpha$) (3) or Hb Bart's hydrops fetalis (4) compared to control without target DNA (1). (*indicated statistically significant difference at p-value < 0.05).