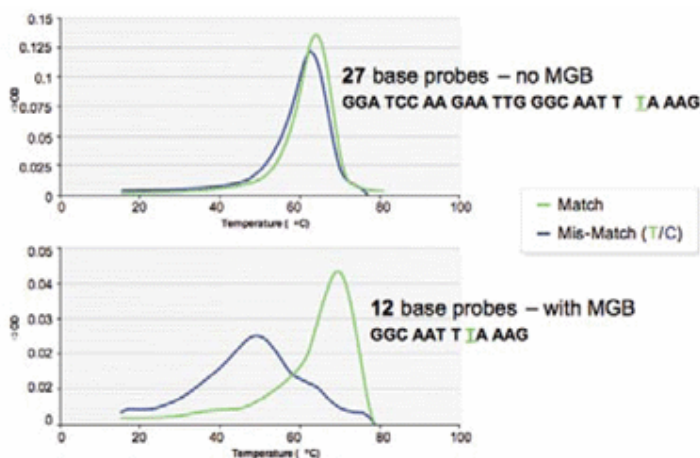


SGS DNA has a world-wide, non-exclusive License Agreement with Epoch Biosciences regarding the use of their modifications, for example MGB and Super bases but also fluorescent dyes such as Yakima Yellow and Redmond Red, in oligonucleotides to be used for **in vitro diagnostic purposes**. The License Agreement allows SGS DNA to manufacture and sell IVD oligonucleotides to customers licensed by Epoch Biosciences.

Minor Groove Binder (MGB)

MGB is a crescent shaped molecule that fits into the minor groove of the double helix structure, stabilizing the binding between the probe and the target. Probes with an attached MGB molecule hybridize more strongly to their complementary sequences than regular DNA probes and display increased melting temperature (15-30 °C) allowing for the use of shorter, yet highly specific, probes. The use of shorter probes also improves mismatch discrimination. One base pair mismatch has a greater impact on binding for shorter probes that it does for longer probes allowing single base variants to be more easily detected.



Super bases

When hybridizing, A and T bases form two hydrogen bonds, whereas G and C bases form three hydrogen bonds. Due to this fact A and T bases have a lower binding capacity and the two hydrogen bonds can be broken easily at relatively low temperatures. As a result of this probes for A-T rich target regions must have a longer length to overcome a low T_m . **Super A** and **Super T base** can form three hydrogen bonds with its complementary base. If one or more normal A or T bases are replaced with one or more Super A or Super T, the T_m will increase and allow for improved hybridization despite a shorter probe.

Probes designed for G-C rich target regions often form secondary structures due to G-G self association. These secondary structures prevent the probe from proper hybridization. **Super G** only forms two hydrogen bonds with its complementary base, compared to a normal G base which forms three hydrogen bonds. This lower binding capacity allows secondary structures from G-G self association to be broken easily at relatively low temperatures.

Yakima Yellow

Yakima Yellow is a fluorescent dye with absorbance maximum at 530 nm and emission maximum at 549 nm.

Redmond Red

Redmond Red is a fluorescent dye with absorbance maximum at 579 nm and emission maximum at 595 nm.