SUPPLEMENTARY METHODS

*Making MOB binding buffer 1:

Make 1M citric acid solution and 1M sodium citrate solution. Mix the two (in different quantities) such that the resulting pH is 4.0-4.5 (this serves as a buffer). Add the Guanidine HCl to this solution (instead of H_2O) to make 7M Guanidine HCl.

#Making MOB binding buffer 2:

Make a 3M citric acid solution. Add Guanidine HCl to this solution to make 7M Guanidine HCl.

NOTE: All mixing was performed by pipetting up and down rather than vortexing. Please refer to Supplementary Table 1.

Add 50µL of Protease K into the bottom of eppendorf tube. Add 200µL MOB Binding Buffer 1 and 100µL Lysing Buffer to 200-250 µL DNA sample. Incubate at 55°C for 15 minutes (cell lines, whole blood). Add 200µL 100% IPA and mix. Add 35µL of Magnetic Beads and mix. Place the tube on the magnetic holder and discard the supernatant. Remove the tube from the magnetic holder, add 500µL of Wash Buffer 1, and mix. Place the tube on the magnetic holder and discard the supernatant. Similarly, remove the tube, add 500µL of Wash buffer 2, and mix. Place the tube on the magnetic holder and remove the supernatant. Repeat the Wash buffer step 2 again. Discard supernatant completely after this washing step, leaving only the magnetic particles bound to the DNA in the tube. Add 50µL Elution Buffer to the eppendorf tube containing Magnetic Particles. To denature DNA for bisulfite treatment, add 6µL 2M NaOH, mix, and incubate at 70°C for 10-15 minutes. Add 12µL of freshly prepared hydroquinone solution and mix. Vortex the NaBisulfite solution, as it should be fully saturated. Add 200µL of prepared NaBisulfite solution and mix. Incubate at 65°C for 4-6 hours. Add 120µL of 10M NaOH. Mix and incubate at 50°C for 10 minutes. Add 350µL of MOB Binding Buffer 2, 100µL of IPA. Mix. Place the tube on a magnetic holder and discard the supernatant. Remove the tube from the magnetic holder, add 500µL of Wash Buffer 1, and mix. Place the tube on the magnetic holder and discard the supernatant. Add 500µL of wash buffer 2 and mix. Place the tube on the magnetic holder and remove the supernatant Repeat steps with Wash Buffer 2 again. Discard supernatant completely after this washing step, leaving only the magnetic particles with DNA in the tube. Elute the DNA from the magnetic beads by adding 100µL of warm elution buffer to the

magnetic beads. Incubate at 80°C for 2 min. Alternatively, if being used for PCR, split the beads to required quantity or number of PCR reactions and directly elute with PCR buffer. Proceed with PCR amplification.