

EmbryoCollect™ Robust, cost effective, fast PGS solution

Development of a 5 hour PGS protocol for a day 5 fresh transfer

Chromosomal aneuploidies are the main cause of abnormal development of embryos and implantation failures. Preimplantation genetic screening (PGS) allows the selection of embryos with euploid chromosomal content and increases IVF treatment efficacy. PGS microarrays are traditionally hybridised for a minimum of 3 hours to overnight. The duration of hybridisation impacts on signal intensity, with shorter times typically reducing the array signal.

Aim – This study aimed to develop a novel hybridisation solution which could significantly decrease protocol duration, enabling same workday results and providing an opportunity for routine fresh transfers of PGS screened embryos.

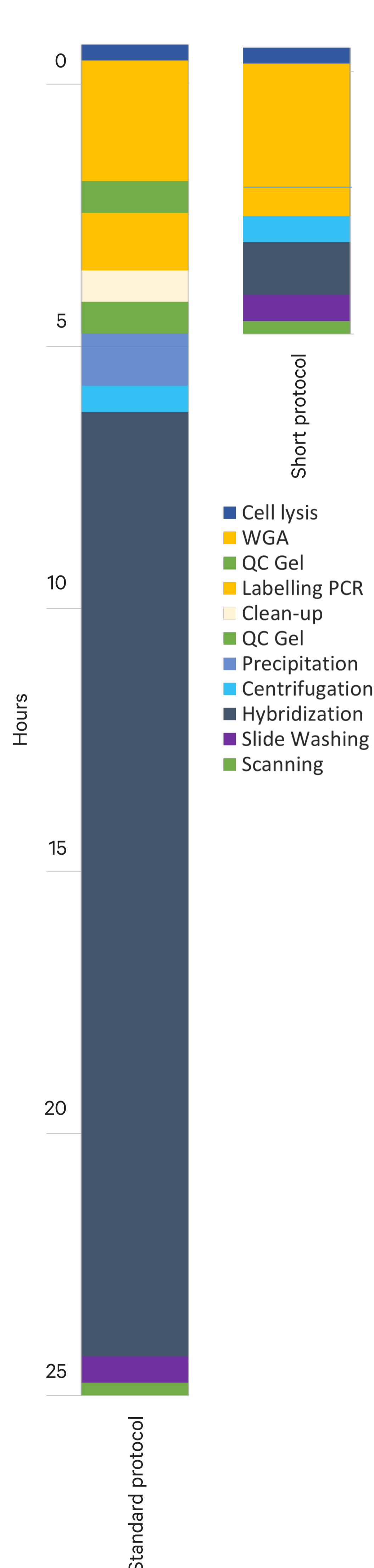
Methods – Aneuploidy screening of single cells of known karyotype (Coriell Institute for Medical Research) was performed according to EmbryoCollect™ protocol (RHS TDS version 3.2;1). Hybridisation was performed overnight using standard protocol or using one of two different hybridisation solutions; solution A or B. Hybridisations with solution A or B were performed for incrementally shorter times (1 hour, 30 mins, 20 mins, 10 mins) at different incubation temperatures (37°C and 45°C). Average fluorescence and background signals for both the 532 (test) and 635 (reference) laser channels were analysed using the RHS Macro version 6.3.

Results – Correct results were achieved with hybridisation solution A for both 1 hour and 30 mins at 45°C, with average SNR of 19.3/21.4 and 21.1/20.1 respectively for the 635/532 laser channels. These results were slightly less, however still comparable to those hybridised overnight at 37°C with standard conditions which gave an average SNR of 36.5/30.6. As the hybridisation time decreased, the percentage of maximum PMT increased from an average of 86% at 1 hour to 94% at 10 mins, compared with 74% as standard. Solution B gave poor signal intensity results for all tested hybridisation times and analysis could not be performed on the microarrays (results not displayed).

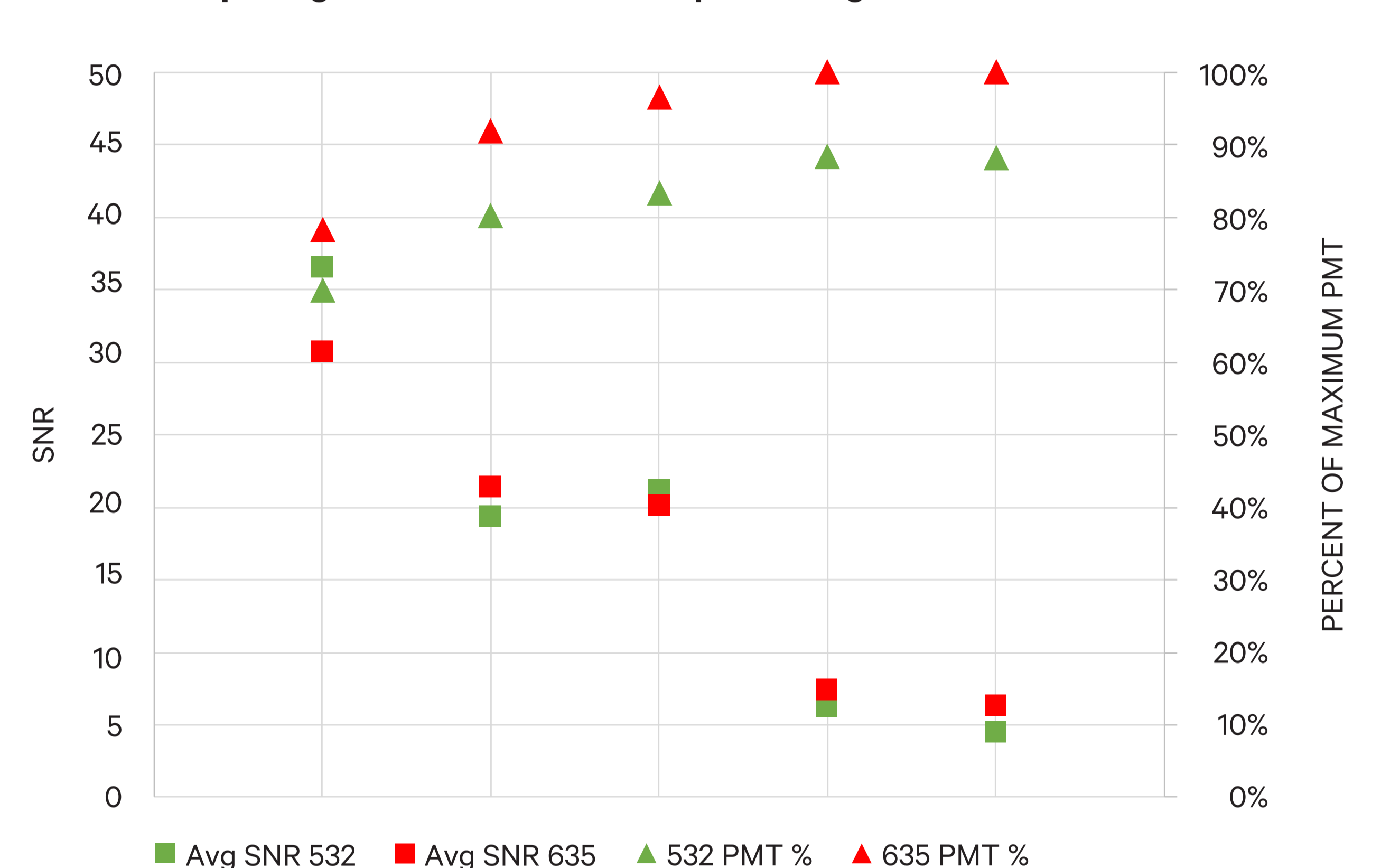
Sandra Protopsaltis and Melinda Jasper
RHS Ltd, 40-46 West Thebarton Road, Thebarton
South Australia 5031, Australia | rhsc.com.au

1. RHS EmbryoCollect Validation Study. 2016. <http://www.rhsc.com.au>

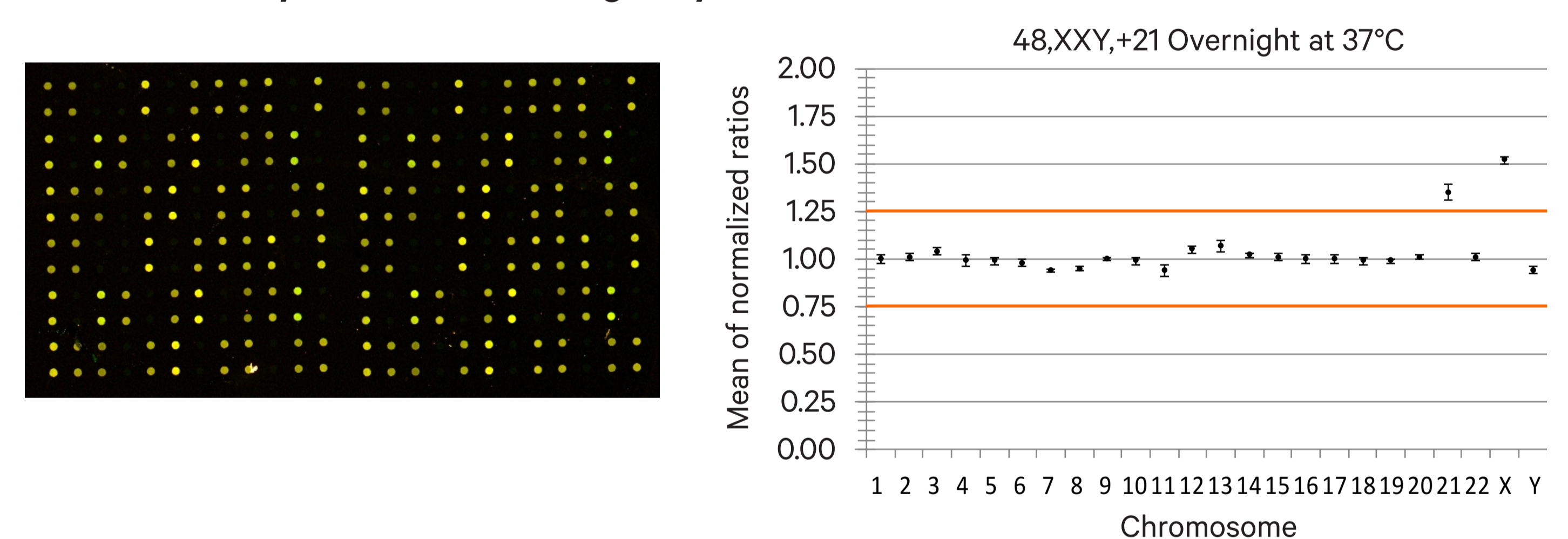
Short PGS Workflow – 5 hours total



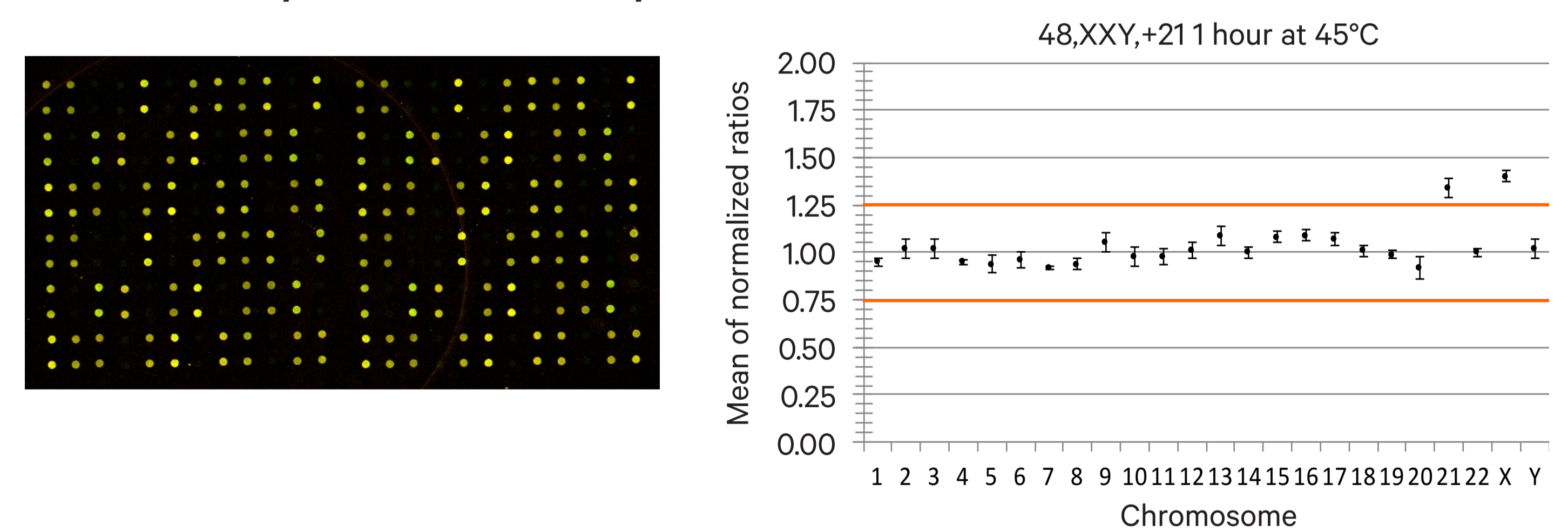
Sample signal to noise ratio and percentage of maximum PMT



PGS microarray results for overnight hybridisation



PGS microarray results for 1 hour hybridization Solution A



Conclusions

- A novel hybridisation solution enables screening for single cell aneuploidy following 30 min to 1 hour hybridisation at 45°C.
- The incorporation of this short hybridisation time into a PGS workflow will comfortably allow same day result reporting for day 5 transfer.
- Further efficiencies are currently being validated with a predicted target being the achievement of a 5 hour or less PGS protocol.