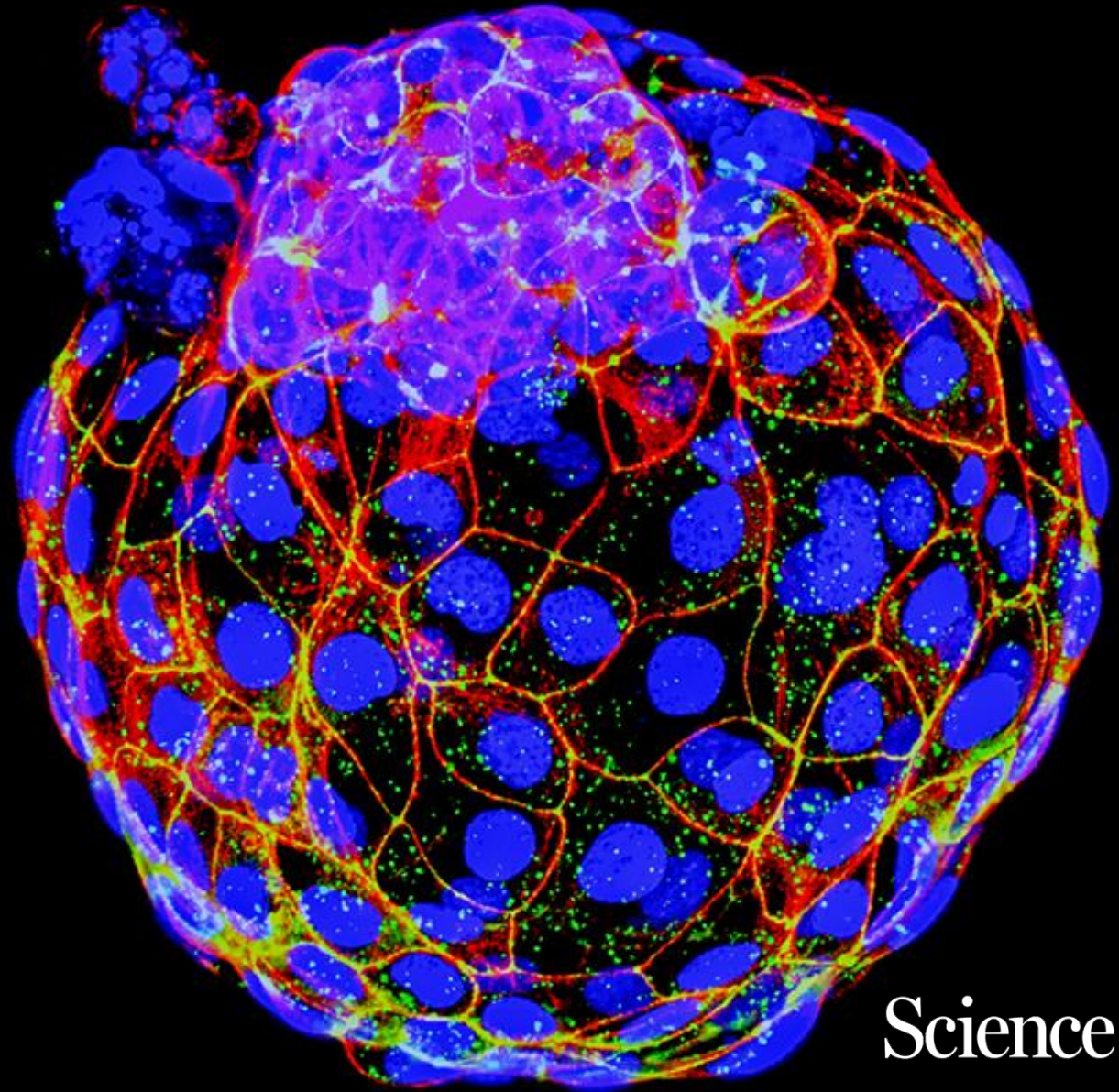


“Are All Mosaics Real?”

Diego Marin, PhD

Deputy Director
Genomic Prediction

Associate Professor
Rutgers University



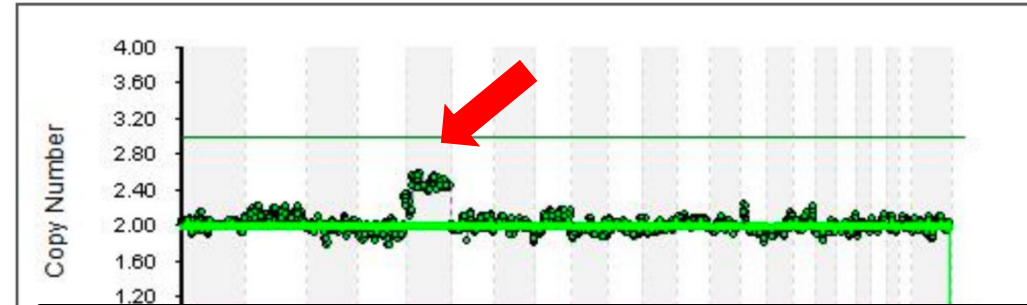
Science

Conflict of Interest

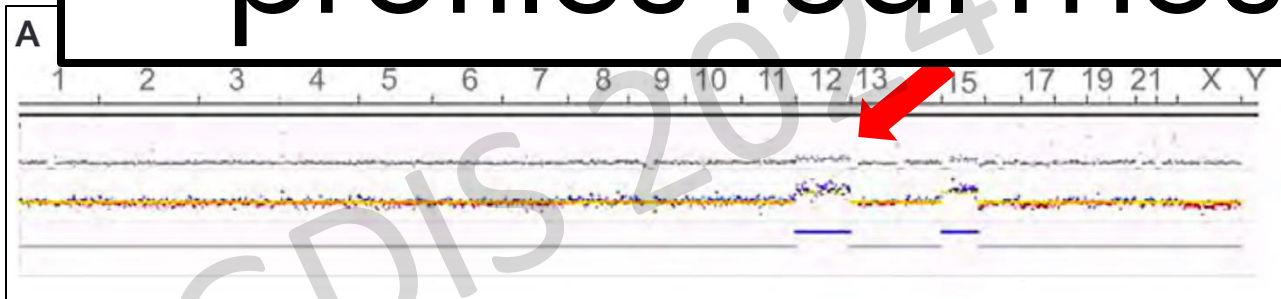
Full-time employee at Genomic Prediction, a PGT provider

PGDIS 2024

Figure 11 Female Sample with a Potential Mosaic Gain of Chromosome 5

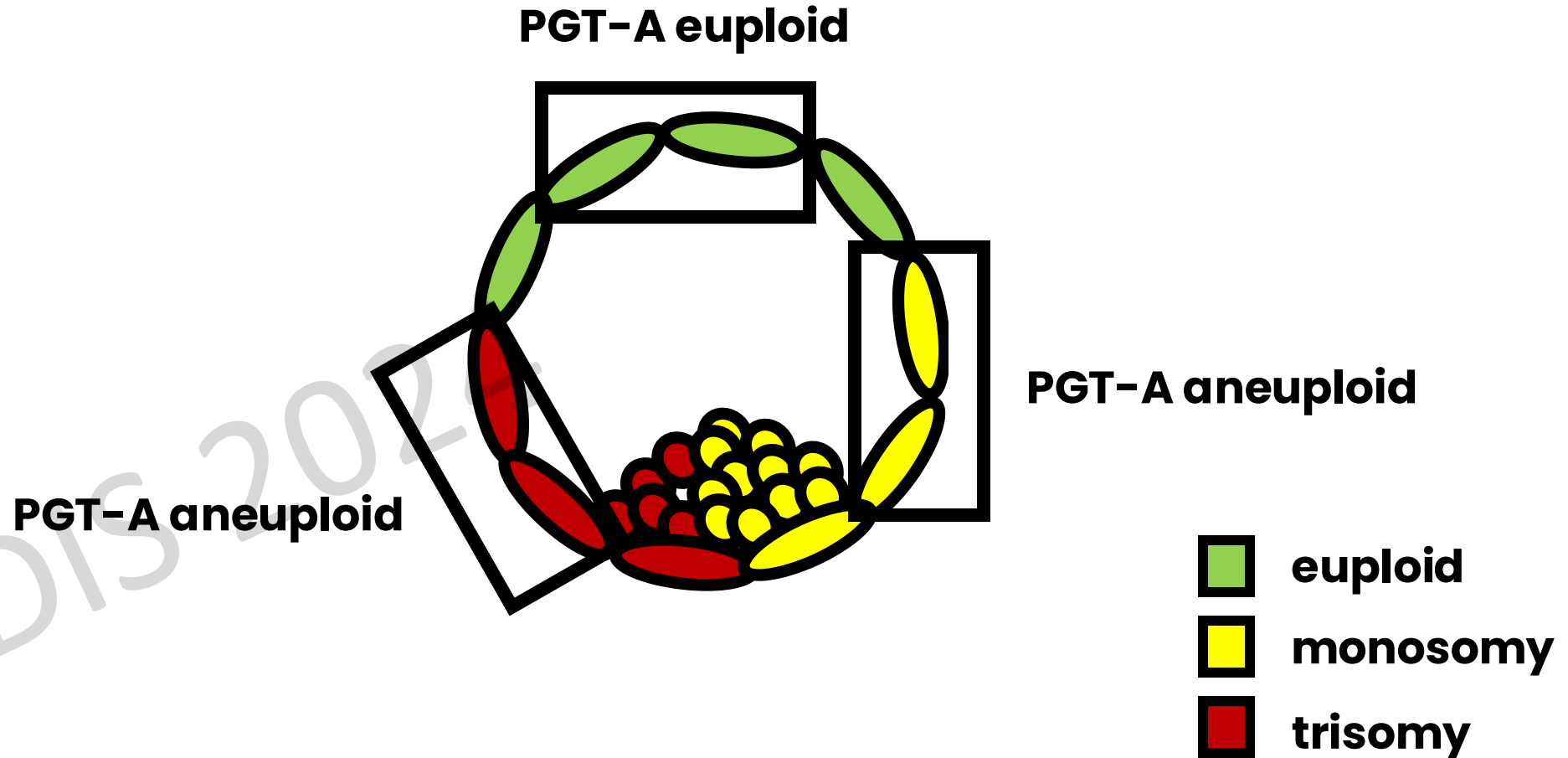


Are all whole chromosome intermediate copy number PGT profiles real mosaic embryos?



Detection of aneuploidy in a single cell using the Ion ReproSeq PGS Kit

PGT-A and Sampling Error



Origin of Aneuploidy Prediction



paternal

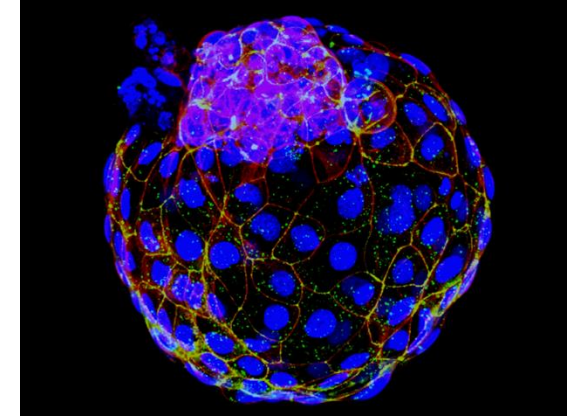
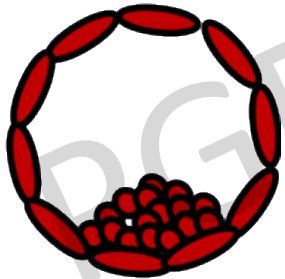


maternal

meiotic



Uniform Aneuploidy

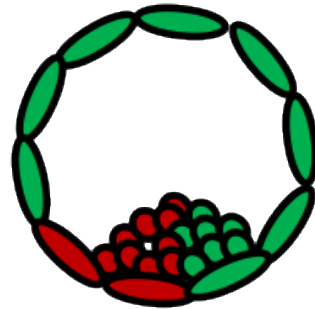


embryonic

mitotic



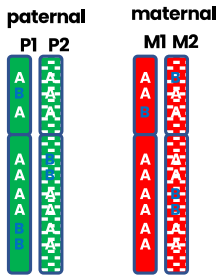
**Non-uniform Aneuploidy
*mosaic***





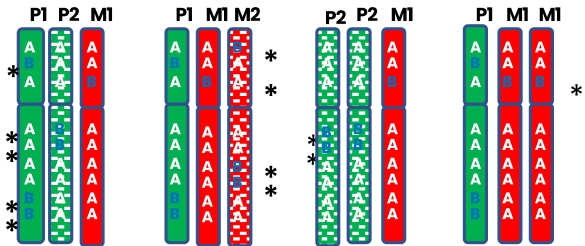
Cell Division Origin of Aneuploidy

1. Identify informative SNPs where there is a unique allele (i.e. 1 B allele and 3 A alleles)



Parents

2. Consider possible trisomy chromosome inheritance outcomes



* unique allele present

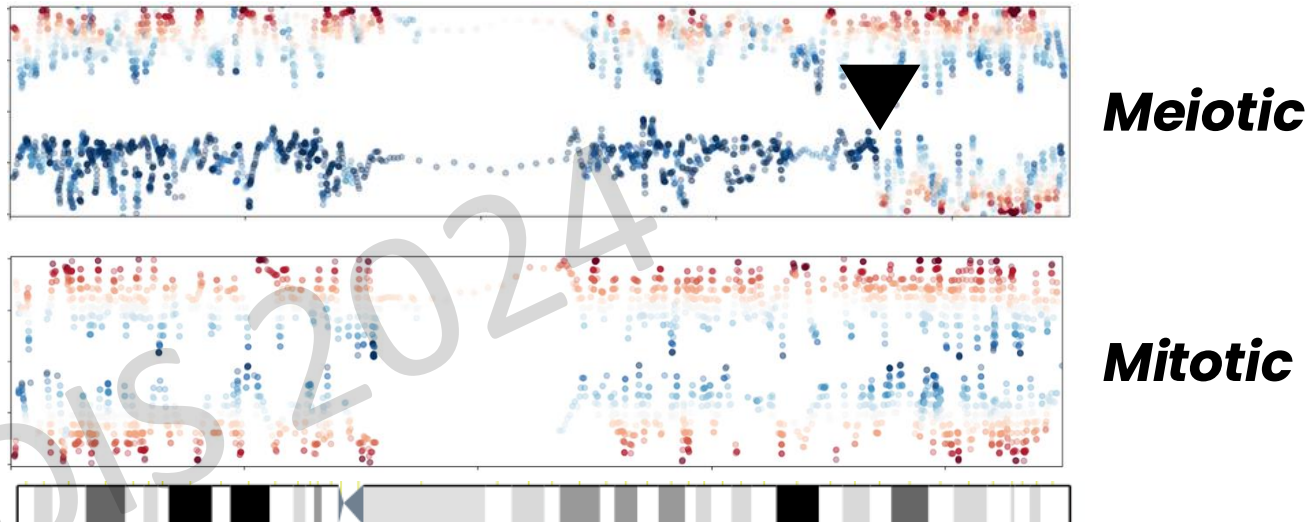
Embryos



IS 2024

Origin of Aneuploidy Prediction

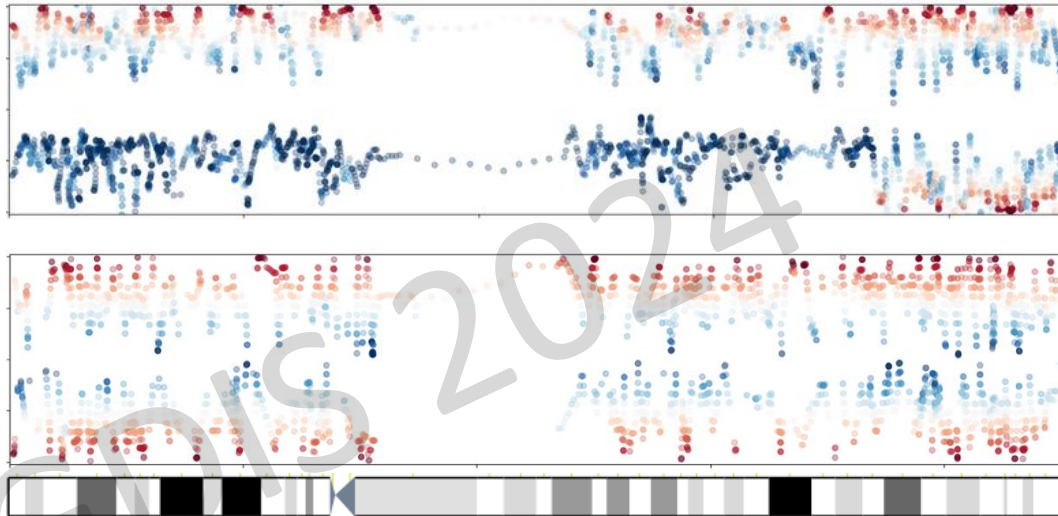
- Meiotic vs Mitotic Aneuploidy



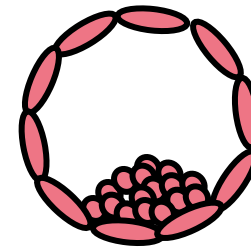
Origin of Aneuploidy Prediction



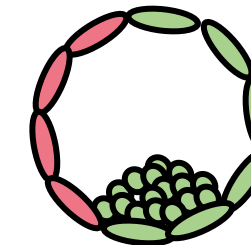
- **UNIFORM** vs **MOSAIC** Aneuploidy



Meiotic UNIFORM



Mitotic MOSAIC



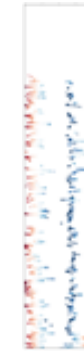
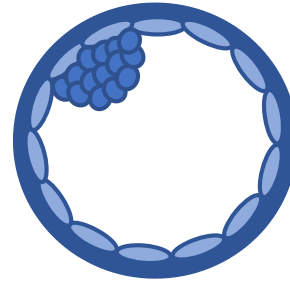
Embryo Rebiopsies



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Rebiopsies as Positive Controls

1. Predict parental and cell division origins of aneuploidy from clinical trophoctoderm biopsies



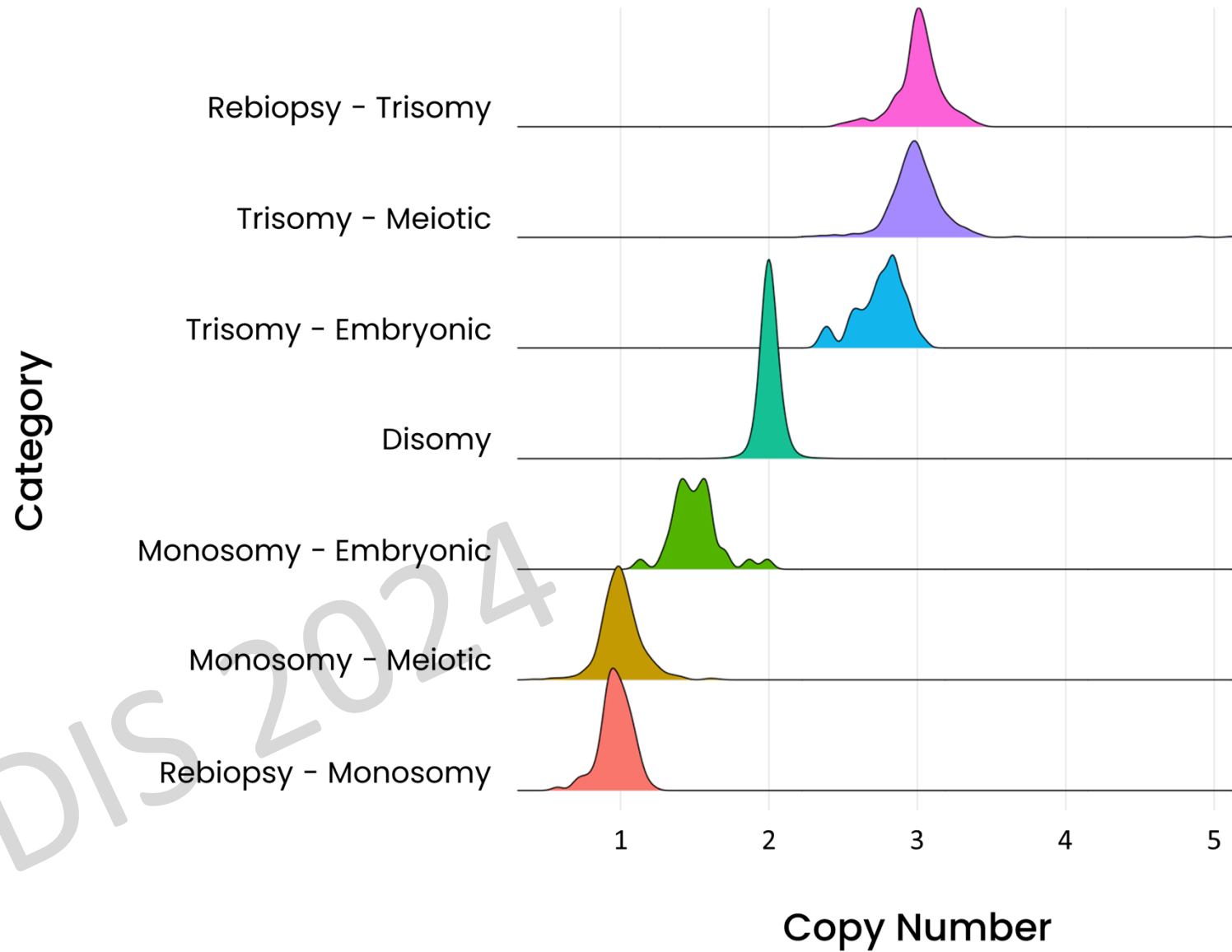
examples

+1(pat)

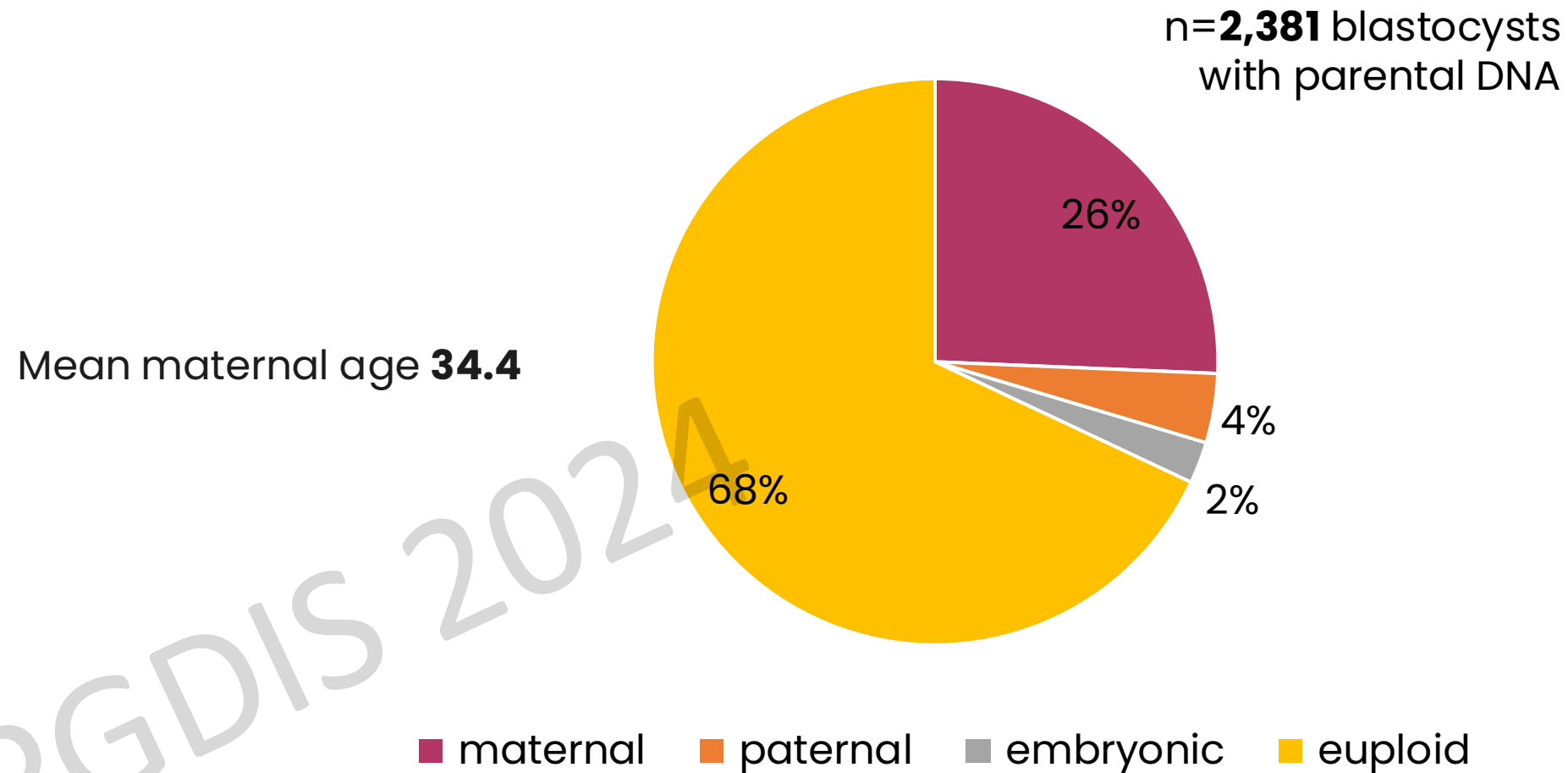
+15(mat)

XXX(emb)

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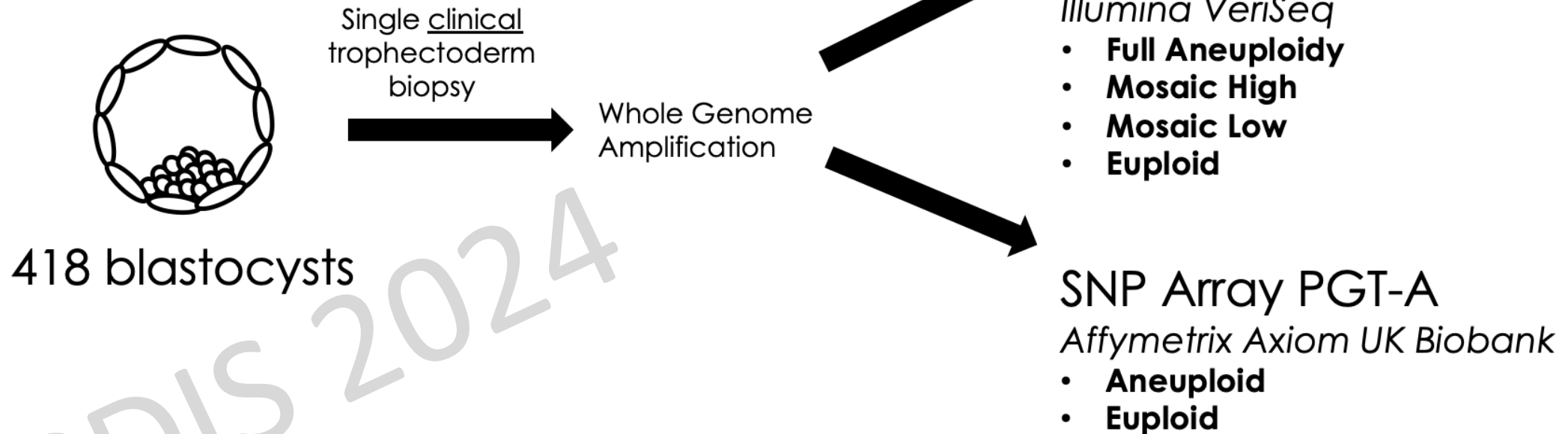
Whole Chromosome Aneuploidies of Mitotic Origin Are Rare



Materials and Methods



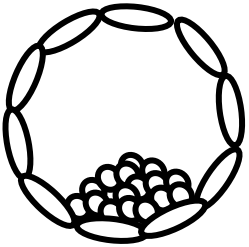
Blinded Interpretations



Jones et al. **ASRM** 2023

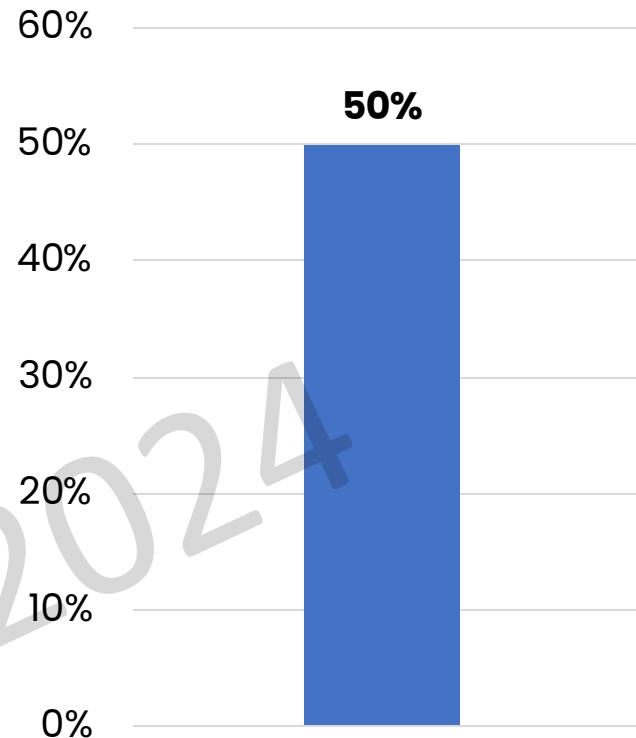
Intermediate Copy Number (ICN) Mosaic Aneuploidy is often actually Euploid

ICN NGS mosaic



4 blinded
rebiopsies
euploid by SNP
array

Euploidy Rate among ICN "mosaics"



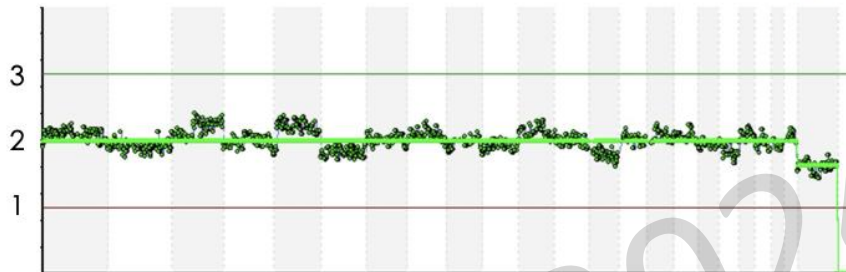
Cascante et al. 2023

(n=40)

Discussion-Example Case

NGS

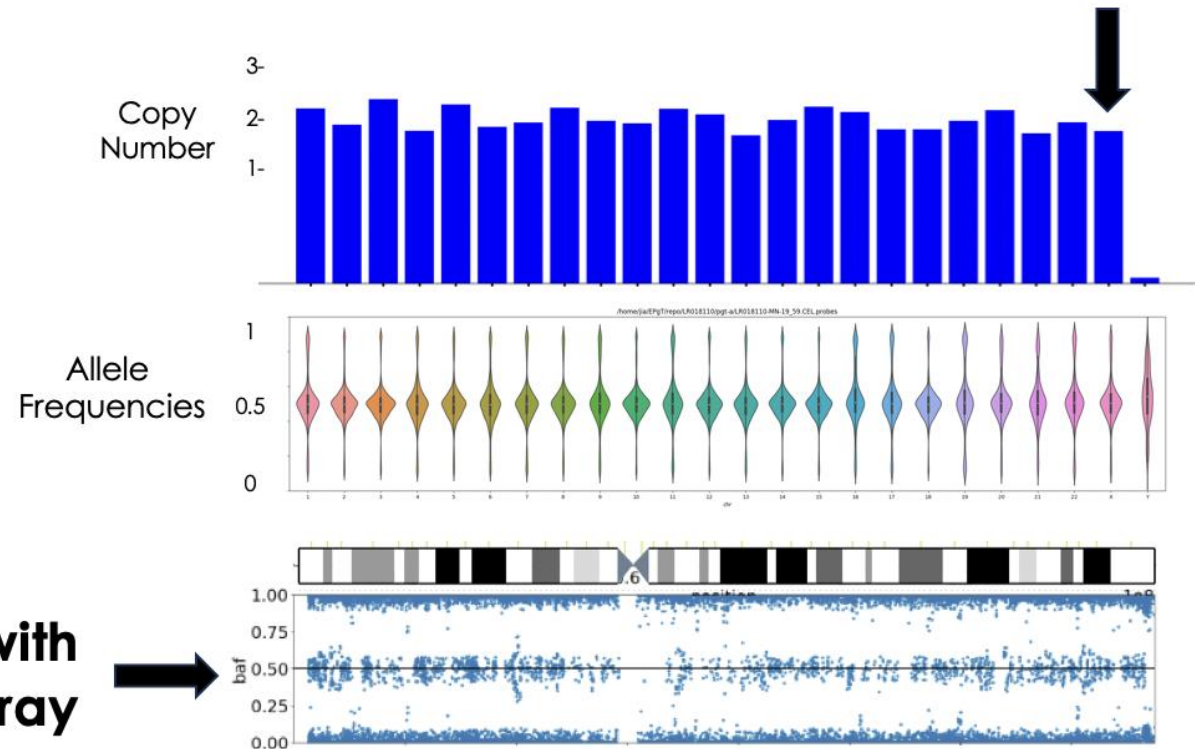
45,XO mosaic range copy number
by NGS



normal allele ratios on chrX with
SNP array

SNP Array

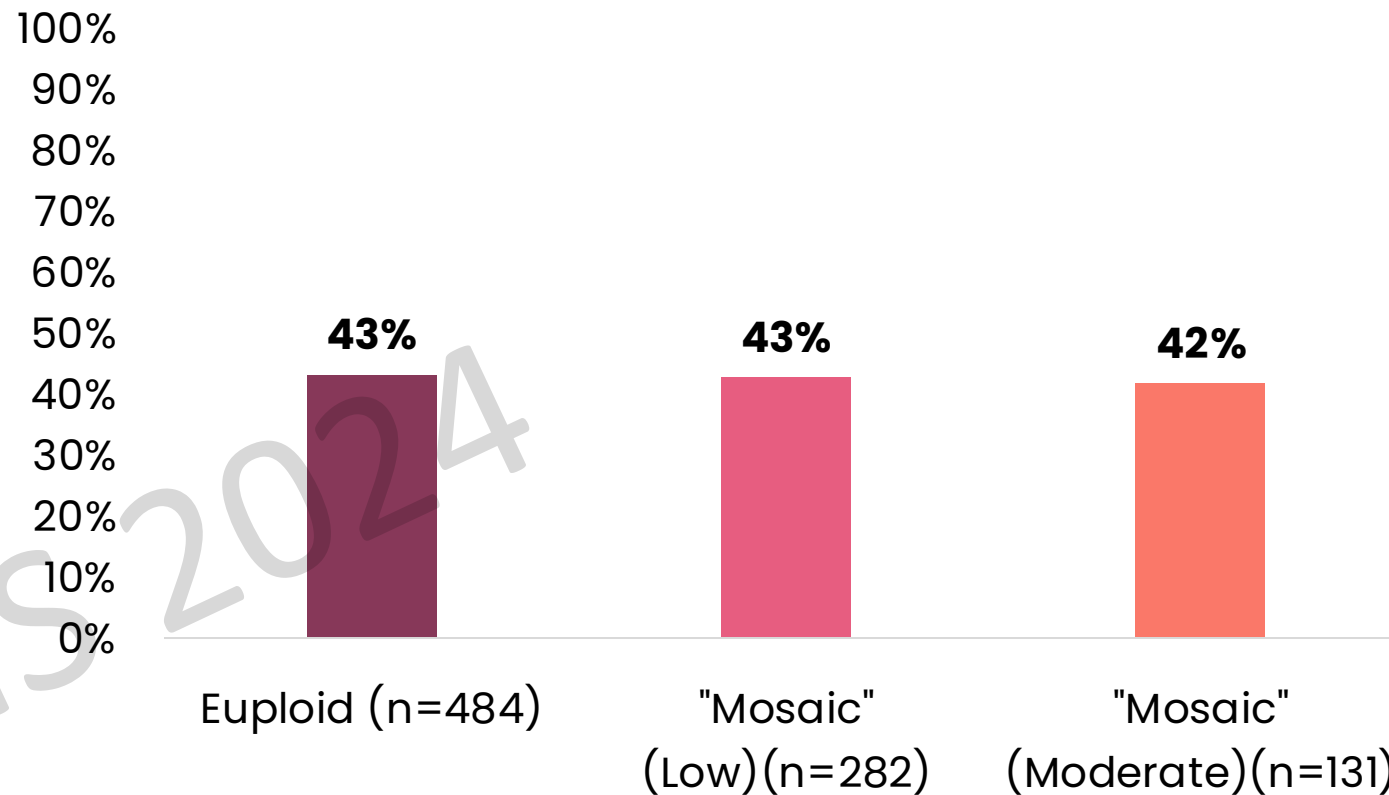
normal chrX copy number by
SNP array



Jones et al. **ASRM** 2023

PGT-A mosaicism predictions are meaningless

Live Birth Rate



Are all whole chromosome
intermediate copy number PGT
profiles real mosaic embryos?

Based on available **DATA**,
most of them probably not

 Segmental aneuploidies are a different story 



Thank you!

diego@genomicprediction.com

