

# Validation of Sex- Biased Transcriptomic Differences in *in vitro* Bovine Embryos

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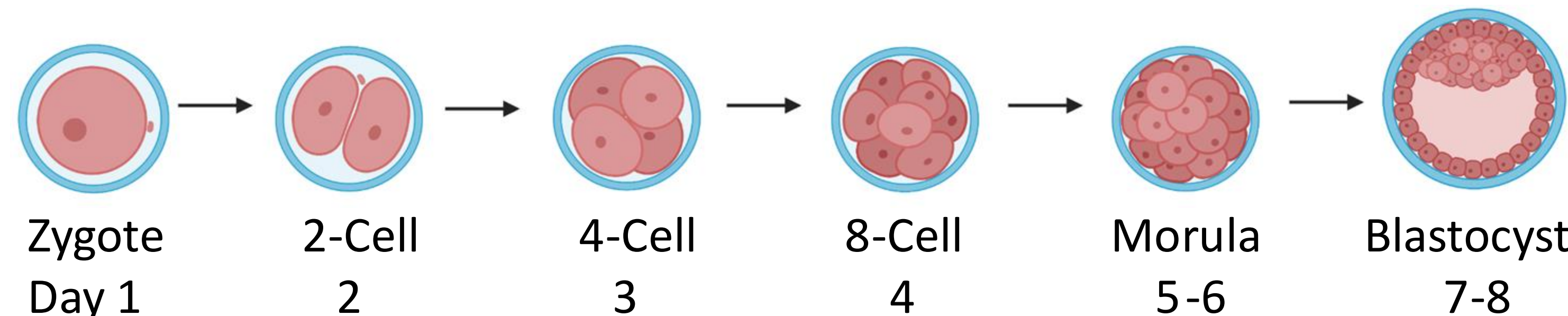
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## Background

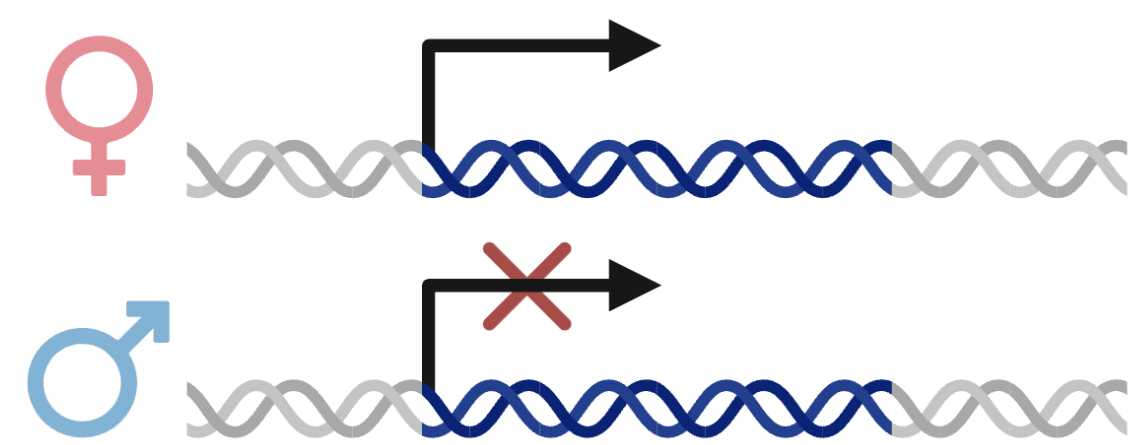
- Early embryonic development is a process of a single-celled zygote developing into a blastocyst via cleavage and blastulation.



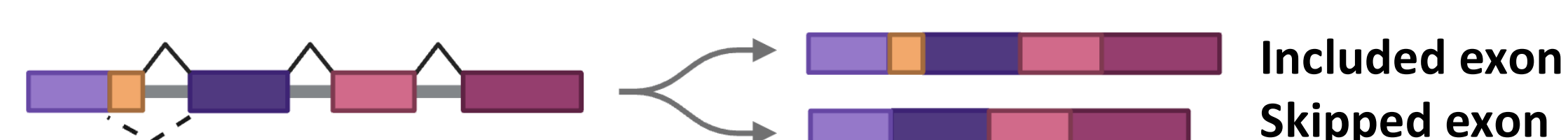
- Male and female *in vitro* bovine embryos exhibit sexual dimorphism in their growth/cleavage rates, with males developing faster than females.

- This phenomenon has been observed in human, mice, cattle, and sheep embryos.

- Sex-biased differentially expressed genes exhibit significantly different expression levels between males and females.



- Sex-biased differential alternative splicing events are defined by a significant difference in the read count ratio of [included exon]/[included exon + skipped exon] between sexes.



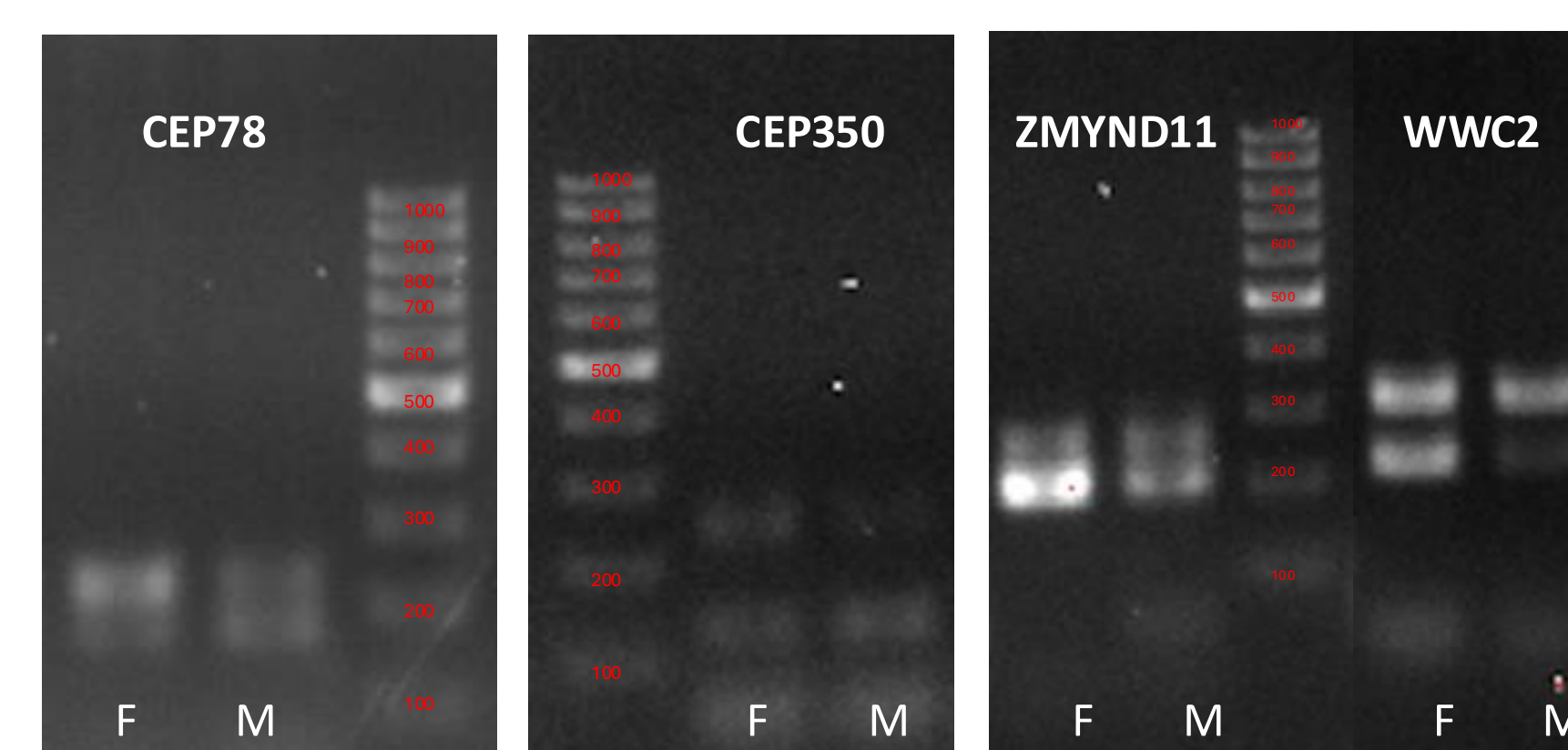
## Results

- Validation of DEG genes



	Relative higher expression in females	Relative higher expression in males	Relative same expression in both sexes
Gene located on X chromosome	XIST		
Gene located on Y chromosome		DDX3Y, ZRSY2Y	
Gene located on autosomal chromosome			GAPDH, H2AFZ

- Validation of DAS genes



The brightness of the band corresponds to the **read count ratio (RCR)**, also known as inclusion level:

**Included exon**  
**Included exon + Skipped exon**

RCR from RNA-seq analysis	CEP78 (F)	CEP78 (M)	CEP350 (F)	CEP350 (M)	ZMYND1 1 (F)	ZMYND1 1 (M)	WWC2 (F)	WWC2 (M)
	0.75	0.42	0.66	1	0.07	0.43	0.54	0.86

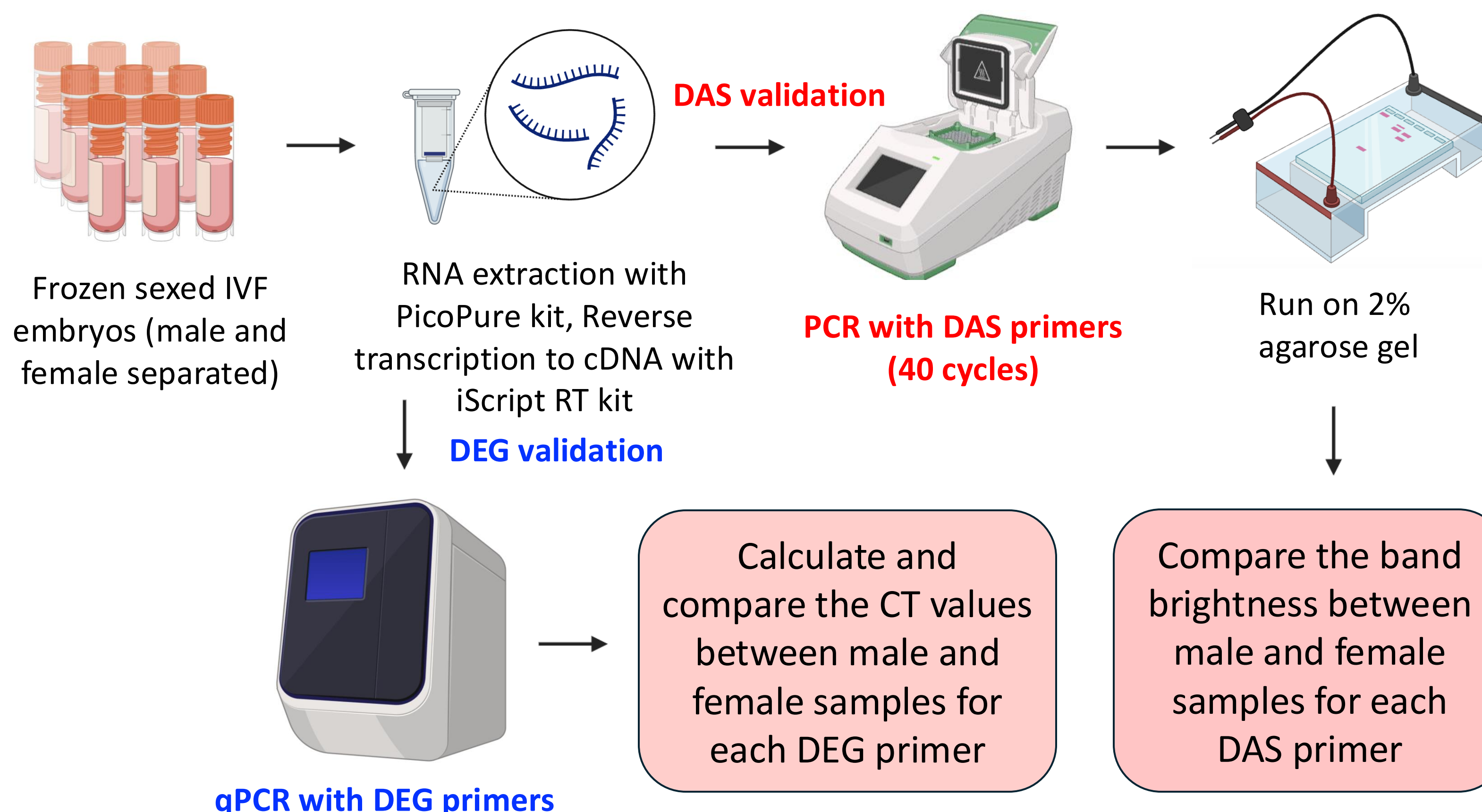
## Objective

Validate the RNA-seq identified differentially expressed genes (DEG) and differential alternative splicing (DAS) events in males vs. females during early embryonic development.

## Conclusions

The expression of selected DEGs and DAS genes validated expression patterns to our RNA-seq data.

## Experimental Design



## Future Work

- Conduct further functional studies for these candidate sex specific DEG/DAS genes.
- Build protocol & pipeline for studying sex-biased transcriptomic differences in animal development and aging.

## Acknowledgements

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