



Change of Aquaporins & Lactate Dehydrogenase gene family's expression patterns during development

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Decorative diagonal lines in red and black are located in the bottom right corner of the slide.



Aquaporin gene family

- family of small integral plasma membrane proteins
- Water selective AQPs – AQP0, 1, 2, 4, 5, 6, 8
- Aquaglyceroporins – AQP3, 7, 9, 10
- Superaquaporins – AQP11, 12



Lactate Dehydrogenase (LDH)

- tissue- and cell type-specific patterns
terminal enzyme of glycolysis
they are present as tetramers
- The activity of LDH in mouse embryos has been assessed in several studies.





In vivo & In vitro Analysis

- Superovulation induction & mouse embryo collection

Post-hCG

	18h	24h	48h	60h	65-68h	80-85h	90h
<i>In vivo</i>	UF	PN	2cell	4cell	8cell	Morula	Blastocyst

- Screening the mRNA expression of Lactate Dehydrogenase and Aquaporin.
- Immunofluorescences Staining.
(Confocal Laser Scanning Microscope . ZEISS)



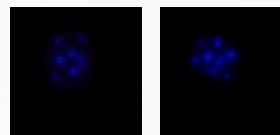
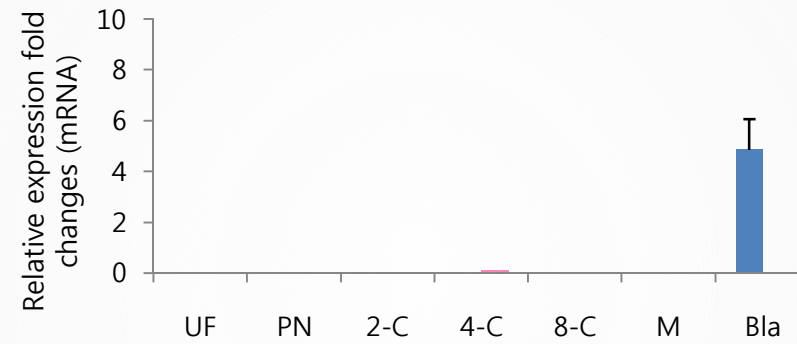
Cluster of AQP

Standard for In vivo expression

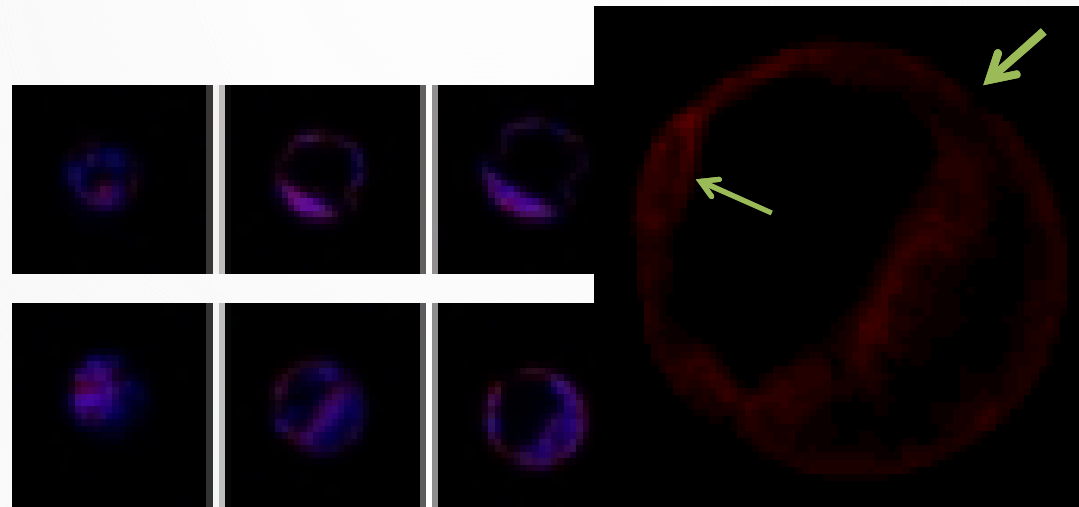
Cluster	Expression patterns	Aquaporin
1	Only expression at blastocyst stage	AQP8
2	Increase from 4cell stage	AQP3
3	Peak at both 4cell and blastocyst stage	AQP9
4	Sharp decrease at morula stage	AQP5
5	Sharp decrease at both 2cell and morula stage	AQP11
6	Continuous decrease after 4cell stage	AQP2
7	No expression	AQP1, 4, 6, 7,12

In Vivo expression pattern – Cluster 1.

AQP 8 _IN VIVO_IN VITRO



Negative Cont.
Goat anti-rabbit
/ Rabbit anti-goat

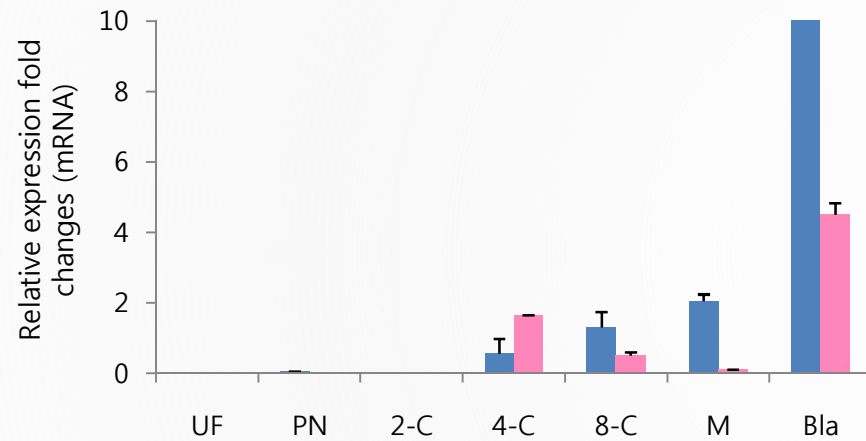


Blastocyst

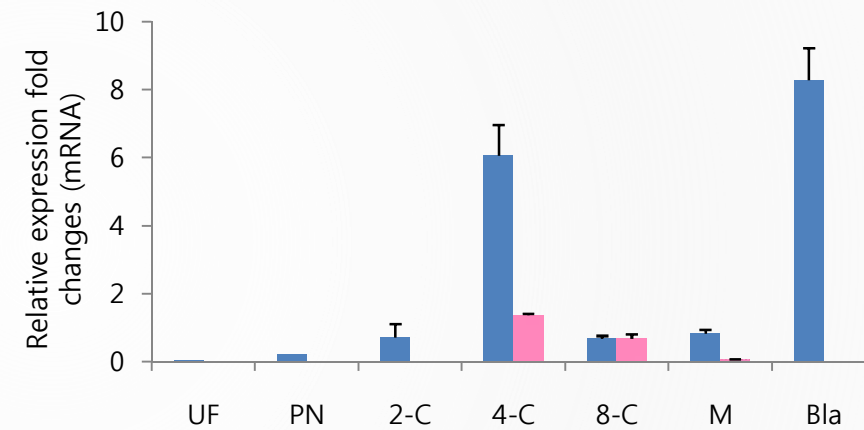


In Vivo expression pattern – Cluster 2 & 3

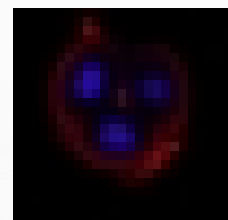
AQP 3 _IN VIVO_IN VITRO



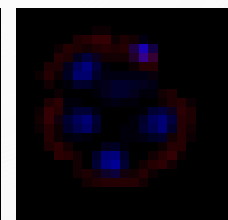
AQP 9 _IN VIVO_IN VITRO



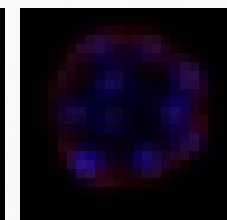
In vivo



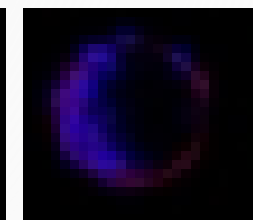
4cell



8cell



Morula

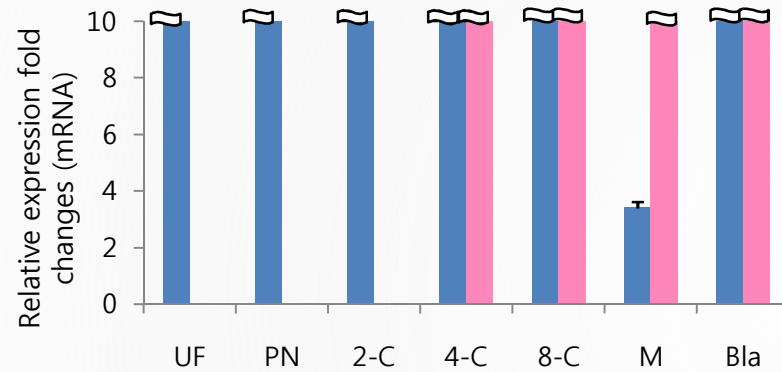


Blastocyst

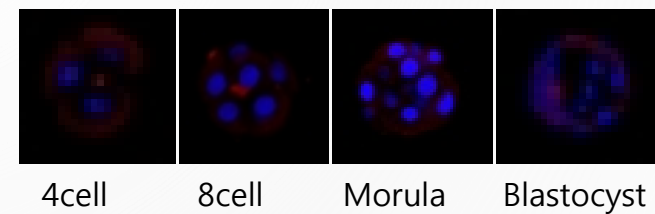
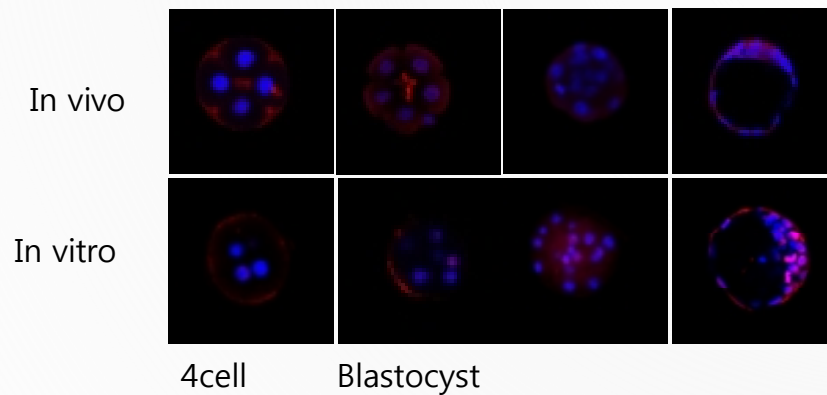
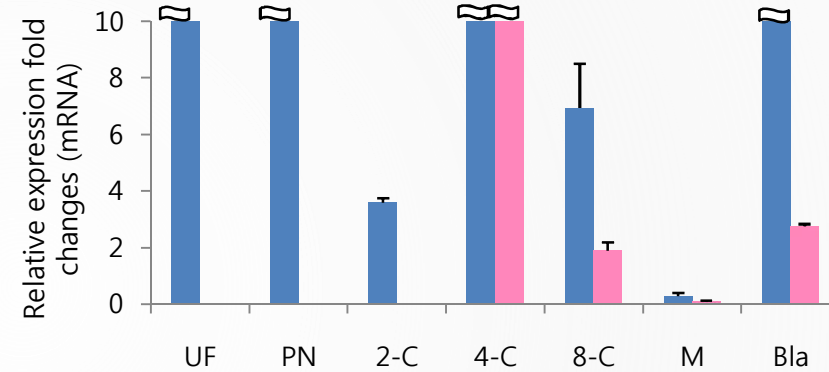


In Vivo expression pattern – Cluster 4 & 5

AQP 5 _IN VIVO_IN VITRO



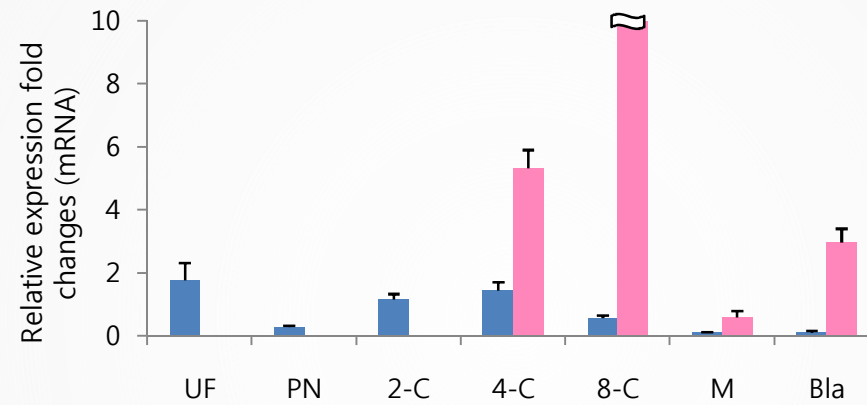
AQP 11 _IN VIVO_IN VITRO



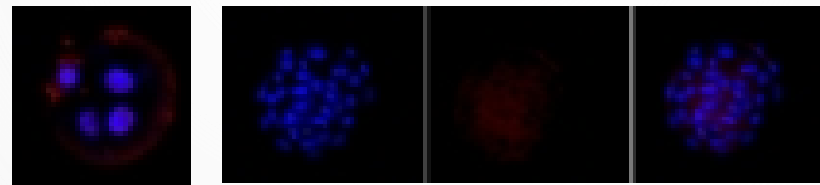


In Vivo expression pattern – Cluster 6

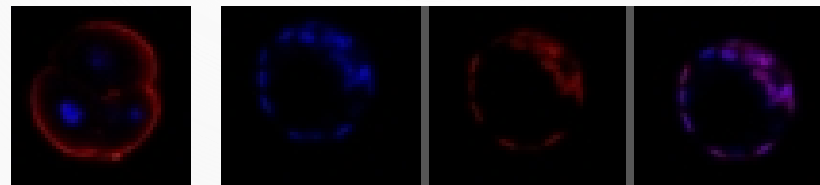
AQP2 _IN VIVO_IN VITRO



In vivo



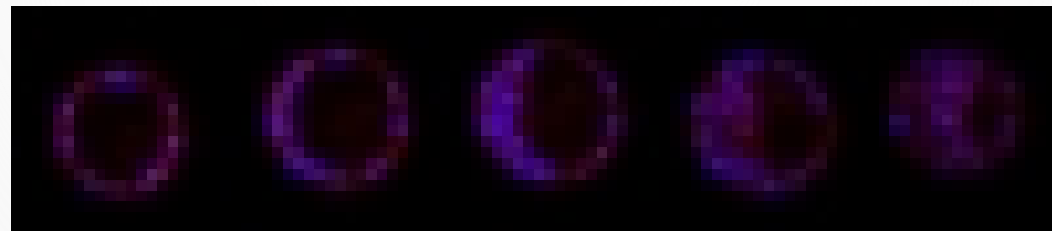
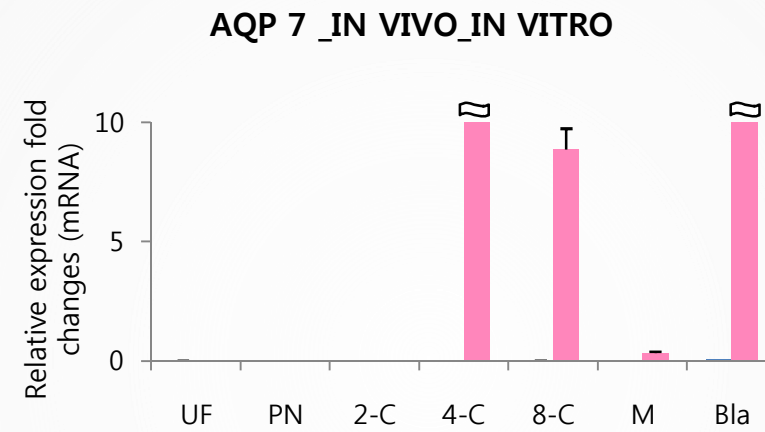
In vitro



4cell

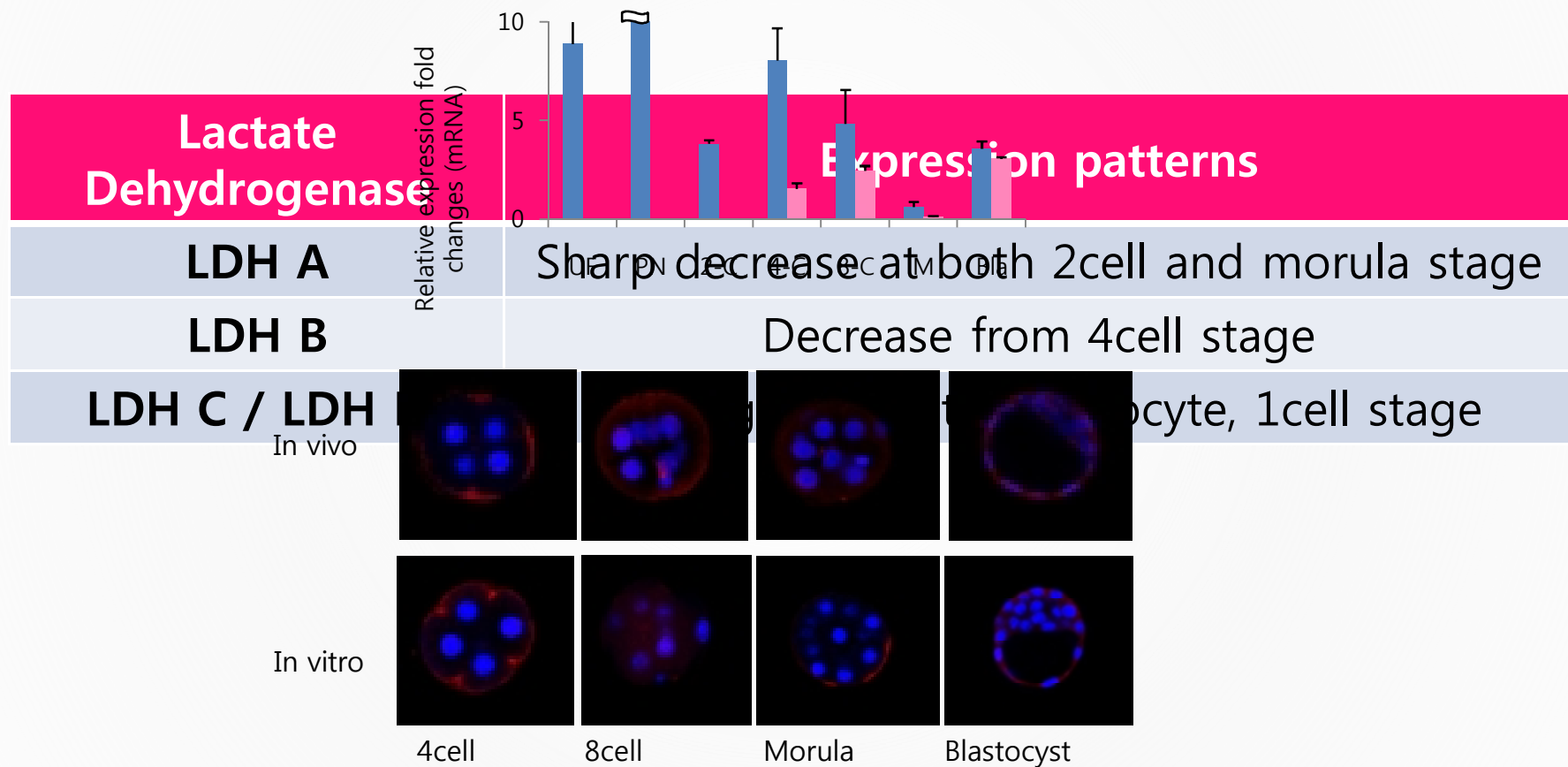
Blastocyst

In Vivo expression pattern – Cluster 7

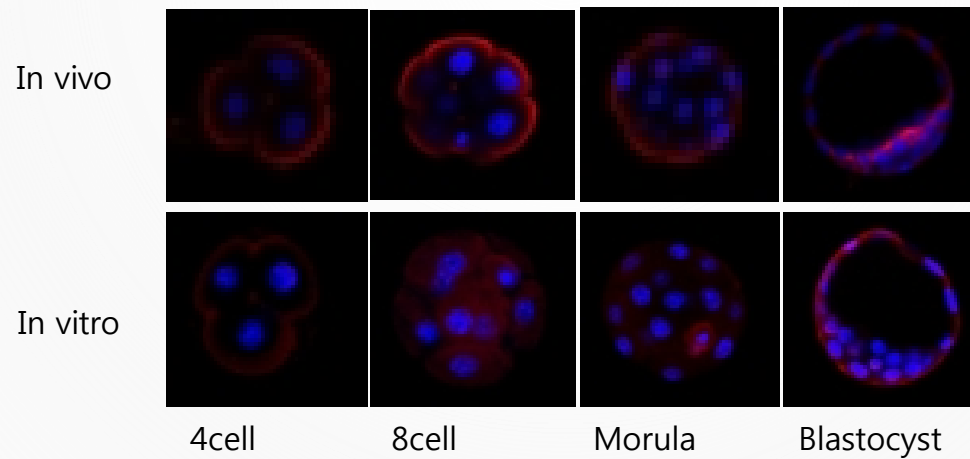
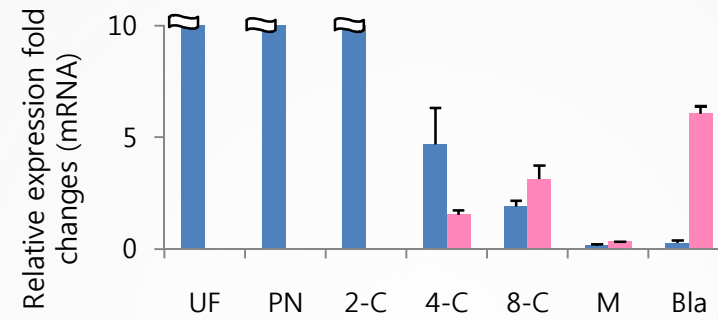


Blastocyst

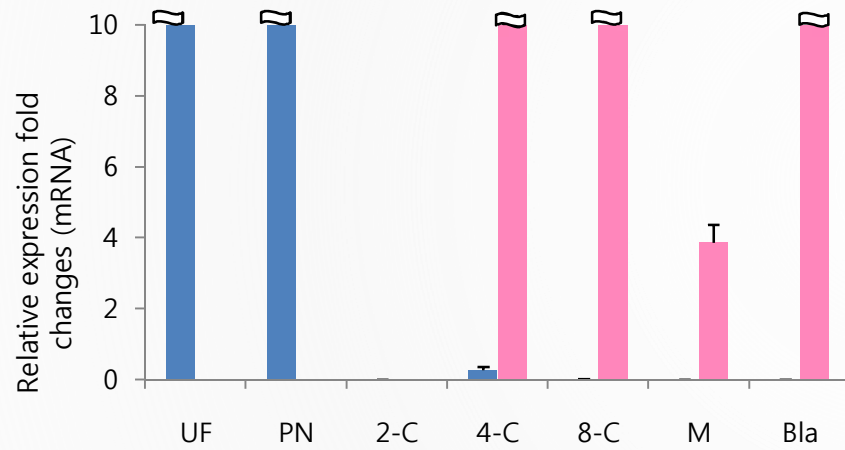
LDH A_IN VIVO_IN VITRO



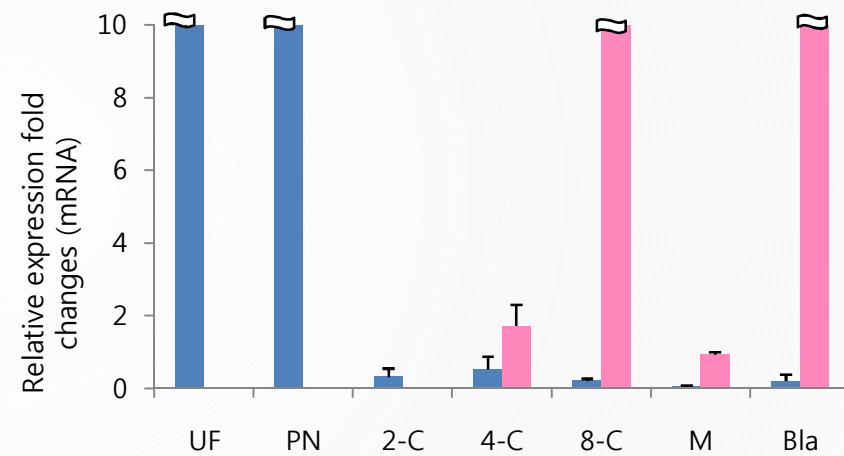
LDH B_IN VIVO_IN VITRO



LDH C_IN VIVO_IN VITRO



LDH D_IN VIVO_IN VITRO





Conclusion

- The expression profiles of AQPs can be classified into 7 clusters in vivo and LDHs into 3 clusters
- The expression profiles of AQPs and LDHs were totally changed by in vitro culture, although blastocyst formed normally
- These results suggest that early stage embryo themselves can adapt to their environments through modulation of a specific gene expression such as AQPs and LDHs, within a given times.



**Thank
You**

