[Dev Biol.](http://www.ncbi.nlm.nih.gov/pubmed/26054700" \o "Developmental biology.) 2015 Sep 1;405(1):137-48. doi: 10.1016/j.ydbio.2015.05.025. Epub 2015 Jun 6.

**Dorsoventral patterning by the Chordin-BMP pathway: a unified model from a pattern-formation perspective for Drosophila, vertebrates, sea urchins and Nematostella.**

[Meinhardt H](http://www.ncbi.nlm.nih.gov/pubmed/?term=Meinhardt%20H%5BAuthor%5D&cauthor=true&cauthor_uid=26054700)1.

[**Author information**](http://www.ncbi.nlm.nih.gov/pubmed/26054700)

**Abstract**

Conserved from Cnidarians to vertebrates, the dorsoventral (DV) axis is patterned by the Chordin-BMP pathway. However, the functions of the pathway's components are very different in different phyla. By modeling it is shown that many observations can be integrated by the assumption that BMP, acting as an inhibitory component in more ancestral systems, became a necessary and activating component for the generation of a secondary and antipodal-located signaling center. The different realizations seen in vertebrates, Drosophila, sea urchins and Nematostella allow reconstruction of a chain of modifications during evolution. BMP-signaling is proposed to be based on a pattern-forming reaction of the activator-depleted substrate type in which BMP-signaling acts via pSmad as the local self-enhancing component and the depletion of the highly mobile BMP-Chordin complex as the long-ranging antagonistic component. Due to the rapid removal of the BMP/Chordin complex during BMP-signaling, an oriented transport and "shuttling" results, although only ordinary diffusion is involved. The system can be self-organizing, allowing organizer formation even from near homogeneous initial situations. Organizers may regenerate after removal. Although connected with some losses of self-regulation, for large embryos as in amphibians, the employment of maternal determinants is an efficient strategy to make sure that only a single organizer of each type is generated. The generation of dorsoventral positional information along a long-extended anteroposterior (AP) axis cannot be achieved directly by a single patch-like organizer. Nature found different solutions for this task. Corresponding models provide a rationale for the well-known reversal in the dorsoventral patterning between vertebrates and insects.

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**KEYWORDS:**

BMP; Chordin; Dorsoventral axis; Nematostella; Organizer formation; Pattern formation; Sea urchin; Smad

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[Nat Commun.](http://www.ncbi.nlm.nih.gov/pubmed/26423516) 2015 Oct 1;6:8434. doi: 10.1038/ncomms9434.

**A deuterostome origin of the Spemann organiser suggested by Nodal and ADMPs functions in Echinoderms.**

[Lapraz F](http://www.ncbi.nlm.nih.gov/pubmed/?term=Lapraz%20F%5BAuthor%5D&cauthor=true&cauthor_uid=26423516)1, [Haillot E](http://www.ncbi.nlm.nih.gov/pubmed/?term=Haillot%20E%5BAuthor%5D&cauthor=true&cauthor_uid=26423516)1, [Lepage T](http://www.ncbi.nlm.nih.gov/pubmed/?term=Lepage%20T%5BAuthor%5D&cauthor=true&cauthor_uid=26423516)1.

[**Author information**](http://www.ncbi.nlm.nih.gov/pubmed/26423516)

**Abstract**

During development of chordates, establishment of the body plan relies on the activity of an organizing centre located on the dorsal side of the embryo that patterns the embryo and induces neural tissue. Intriguingly, the evolutionary origin of this crucial signalling centre remains unclear and whether analogous organizers regulate D/V patterning in other deuterostome or protostome phyla is not known. Here we provide evidence that the ventral ectoderm of the sea urchin embryo is a long-range organizing centre that shares several fundamental properties with the Spemann organizer: the ability to induce duplicated embryonic axes when ectopically induced, the ability to induce neural fate in neighbouring tissues and the ability to finely regulate the level of BMP signalling by using an autoregulatory expansion-repression mechanism. These findings suggest that the evolutionary origin of the Spemann organizer is more ancient than previously thought and that it may possibly be traced back to the common ancestor of deuterostomes.

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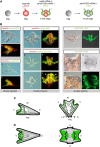
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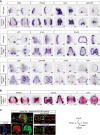
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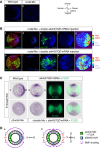
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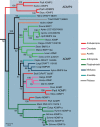
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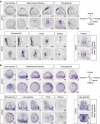
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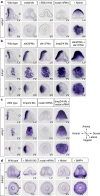
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* [Abstract](http://www.ncbi.nlm.nih.gov/pubmed/26828433)

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[PLoS One.](http://www.ncbi.nlm.nih.gov/pubmed/26828433) 2016 Feb 1;11(2):e0147867. doi: 10.1371/journal.pone.0147867. eCollection 2016.

**The Salivary Scavenger and Agglutinin (SALSA) in Healthy and Complicated Pregnancy.**

[Reichhardt MP](http://www.ncbi.nlm.nih.gov/pubmed/?term=Reichhardt%20MP%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)1, [Jarva H](http://www.ncbi.nlm.nih.gov/pubmed/?term=Jarva%20H%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)1,2, [Lokki AI](http://www.ncbi.nlm.nih.gov/pubmed/?term=Lokki%20AI%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)1,3, [Laivuori H](http://www.ncbi.nlm.nih.gov/pubmed/?term=Laivuori%20H%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)3,4,5; [FINNPEC study group](http://www.ncbi.nlm.nih.gov/pubmed/?term=FINNPEC%20study%20group%5BCorporate%20Author%5D), [Vuorela P](http://www.ncbi.nlm.nih.gov/pubmed/?term=Vuorela%20P%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)4,6, [Loimaranta V](http://www.ncbi.nlm.nih.gov/pubmed/?term=Loimaranta%20V%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)7, [Glasner A](http://www.ncbi.nlm.nih.gov/pubmed/?term=Glasner%20A%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)8, [Siwetz M](http://www.ncbi.nlm.nih.gov/pubmed/?term=Siwetz%20M%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)9, [Huppertz B](http://www.ncbi.nlm.nih.gov/pubmed/?term=Huppertz%20B%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)9,10, [Meri S](http://www.ncbi.nlm.nih.gov/pubmed/?term=Meri%20S%5BAuthor%5D&cauthor=true&cauthor_uid=26828433)1,2.

[**Author information**](http://www.ncbi.nlm.nih.gov/pubmed/26828433)

**Abstract**

Pre-eclampsia is a leading cause of maternal and perinatal morbidity and mortality worldwide. The etiology is not clear, but an immune attack towards components of placenta or fetus has been indicated. This involves activation of the complement system in the placenta. We have previously described the presence of the complement-regulating protein salivary scavenger and agglutinin (SALSA) in amniotic fluid. In this study we investigated the potential role of SALSA in pregnancy by analyzing its presence in amniotic fluid and placental tissue during healthy and complicated pregnancies. SALSA levels in amniotic fluid increased during pregnancy. Before 20 weeks of gestation the levels were slightly higher in patients who later developed pre-eclampsia than in gestation age-matched controls. In the placenta of pre-eclamptic patients syncytial damage is often followed by the formation of fibrinoid structures. SALSA was found clustered into these fibrinoid structures in partial co-localization with complement C1q and fibronectin. In vitro analysis showed direct protein binding of SALSA to fibronectin. SALSA binds also to fibrin/fibrinogen but did not interfere with the blood clotting process in vitro. Thus, in addition to antimicrobial defense and epithelial differentiation, the data presented here suggest that SALSA, together with fibronectin and C1q, may be involved in the containment of injured placental structures into fibrinoids.

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26828433

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RESEARCH Reproductive Biology and Endocrinology 2014, 12:110

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Fine morphological assessment of quality of human mature oocytes after slow freezing or vitrification with a closed device: acomparative analysis

Veronica Bianchi1, Guido Macchiarelli2, Andrea Borini1, Michela Lappi1, Sandra Cecconi2, Selenia Miglietta3,

Giuseppe Familiari3 and Stefania A Nottola3\*

**Abstract**

Background: Human mature oocytes are very susceptible to cryodamage. Several reports demonstrated that vitrification might preserve oocyte better than slow freezing. However, this is still controversial. Thus, larger clinical, biological and experimental trials to confirm this concept are necessary. The aim of the study was to evaluate and compare fine morphological features in human mature oocytes cryopreserved with either slow freezing or vitrification.

Methods: We used 47 supernumerary human mature (metaphase II) oocytes donated by consenting patients, aged 27-32 years, enrolled in an IVF program. Thirtyfive oocytes were cryopreserved using slow freezing with 1.5 M propanediol +0.2 M sucrose concentration (20 oocytes) or a closed vitrification system (CryoTip Irvine Scientific CA) (15 oocytes). Twelve fresh oocytes were used as controls. All samples were prepared for light and transmission electron microscopy evaluation.

Results: Control, slow frozen/thawed and vitrified/warmed oocytes (CO, SFO and VO, respectively) were rounded, 90–100 μm in diameter, with normal ooplasm showing uniform distribution of organelles. Mitochondria-smooth endoplasmic reticulum (M-SER) aggregates and small mitochondria-vesicle (MV) complexes were the most numerous

structures found in all CO, SFO and VO cultured for 3–4 hours. M-SER aggregates decreased, and large MV complexes increased in those SFO and VO maintained in culture for a prolonged period of time (8–9 hours). A slight to moderate vacuolization was present in the cytoplasm of SFO. Only a slight vacuolization was present in VO, whereas vacuoles

were almost completely absent in CO. Amount and density of cortical granules (CG) appeared abnormally reduced in SFO and VO, irrespective of the protocol applied.

Conclusions: Even though, both slow freezing and vitrification ensured a good overall preservation of the oocyte, we found that: 1) prolonged culture activates an intracellular membrane “recycling” that causes the abnormal transformation of the membranes of the small MV complexes and of SER into larger rounded vesicles; 2) vacuolization

appears as a recurrent form of cell damage during slow freezing and, at a lesser extent, during vitrification using a closed device; 3) premature CG exocytosis was present in both SFO and VO and may cause zona pellucida hardening.

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Keywords: Oocyte, Cryopreservation, Slow freezing, Vitrification, Ultrastructure, Human

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