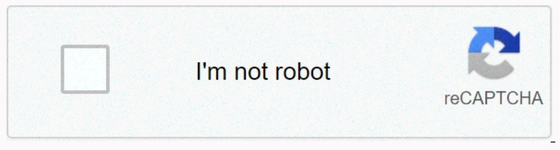

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Human blastocyst formation in vitro

RNA-Protein Binding IGF2BP2/IMP2 is a critical maternal activator in the early zigotic genome of activation. Liu HB, Muhammad T, Guo Y, Li MJ, Sha QQ, Zhang CX, Liu H, Zhao SG, Zhao H, Zhang H, Du YZ, Sun K, Liu K, Lu G, Guo XJ, Sha J, Fan HY, Gao F, Chen ZJ. Liu HB, et al. Adv Sci (Weinh). 2019 May 24;6(15):1900295. doi: 10.1002/advs.201900295. eColition 2019 Aug 7. Adv Sci (Weinh). 2019. PMID: 31406667 Free PMC article. Human Blastocyst (day 5)[1] (Greek, blastos = kal + cistos = cavity) or blastula, a term used to describe hollow cell mass formed in early development. The blastocist consists of cells that form a layer of trophectoderma (TE, trophoblast), internal cell mass (ICM, embryonic explosion) and blastogol (fluid-filled cavity). The internal cell mass will form the entire embryo and is the source of the true stem stem cells, which can form all types of cells within the embryo. In mammals, trofektoderm will form key cells (trofoblast) of the fatal component of the placenta. In humans, the development phase of the blastocyst occurs in the first and second weeks after fertilization (week 3 and 4 GA) and is initially described as the Carnegie Phase 3. This phase is followed by blastocyst ejaculation and implantation. One of the first key development decisions in the moruli for the development of blastocyst is the fate of TE cells or ICM. Blastomers genome divergenca[4] Mouse development blastocyst[5] Some recent findings Computating data analysis of single-cell trancritical transcritically eluciding stabilization of the oct4 expression in the composition E3.25 mouse predimplantation [6] Our computational analysis is focused on transition 32- to 64-cell mice embryos, Embryonic day (3.25), chiju is the study u literature concentrated umnozeno on nuddu for the first nace second cell-fate decision, Specification of internal cell mass (ICM) to primitive endoderma (PE) i epiblasta (EPI). We analyzed single-cell (sc) data on microarray transcriptomics from E3.25 using hierarhical Optimal k-Means (HOkM) clusters, i identified two groups of ICM-cell: a group cell from an embryo with less than 34 cells (E3,25-LNCs), and another group cell from an embryo with more than 33 cells (E3,25-HNC) corresponding to two developmental phases. Although we found massive heterogeneity in ICM cells at E3.25-HNC with more than 3,800 genes with trankriptomy bifurcation, many of which are PE and EPI markers, we showed that E3.25-HNCs are not EITHER PE or EPI. Importantly, in analyzing the genes expressed differently between E3,25-LNC and E3,25-HNC, we discovered a non-autonomous mechanism based on the minimum number of four internal cell contacts in the ICM that activates Oct4 in pre-implantation brood. Oct4 is highly expressed but unstable at E3,25-LNC and stabilises at a high level at E3,25-HNC, with a high-expressed Bsg and to establish an early naïal pluripotent state. Our results show that the pluripotent state that we found in ICM at E3.25-HNC is the in vivo counterparty of a new, very early pluripotent state. We compared the transcritically profile of this in vivo E3.25-HNC pluripotent state, Together with the profile E3.25-LNC, E3.5 EPI and E4.5 EPI cell, with the profiles of all embryonic stem cells (ESC) available u GEO database from the same platform (over 600 microarrays). Physiological profile of non-differentiated bovine blastocysts derived from trophoblasts[7] Trophectoderm blastocytes mediate early events in communication between the foetus and mothers, allowing implantation and establishment of a functional placenta. Inadequate or impaired developmental events associated with trophoblasts have a direct impact on the early survival of the foetus and successful implantation at a pivotal period corresponding to a high incidence of pregnancy losses in dairy cows. The molecular basis of bovine trofectoderma development and signalling for the start of implantation is still not well understood. In this study, we developed methods for growing non-differentiated bovine blastocyst trophoblasts and used both trankriptomy and proteomics in early colonies to categorize and elucid their functional characteristics. Based on absolute abundance, 9270 transcripts and 1,418 proteins were identified and analysed. We profiled a comprehensive list of growth factors, cytokines and other important factors that can effectively affect paracrine communication in uterine microsoil. Functional categorisation and analysis revealed new information on structural organisation, composition of extracellular matrice, cell composition and components for adhesion, transmission networks and metabolic preferences. Our data show the fundamental physiology of bovine trofektoderma and indicate signs of a self-renewable non-differentiation state similar to the trophoblast stem cells described in other species. Four simple rules sufficient to generate mammalian blastocyst[5] We implemented experimentally reported mechanisms for polarity, cell signaling, adhesion and apoptosis as a set of developmental rules in silicone model of physically interacting cells. It is found that this model reproduces specific mutant phenotypes quantitatively and provides an explanation for the occurrence of heterogeneity without the need for an initial transcribation variation. It also suggests that the fixed time point for cell competence for fibroblast growth factor (FGF)/extracellular signal regulated kinase (ERA) should determine the embryonic clock allowing certain occurrences of modification, a concept that is quantifyed by in vitro embryo manipulation. Based on these observations, we conclude that the minimum set of rules allows the embryo to experiment with the stochastic gene and could provide the strength needed to diversification of the regulatory network for gene predimplantation. More recent articles This table enables automated computer search of an external PubMed database using the specified text link Search Term. This search now requires a manual connection because the original PubMed extension was disabled. The list of references displayed does not reflect any editorial selection of material based on content or relevance. References also appear in this list based on the date of actual page views. References listed on the remaining content pages and related discussion pages (listed under the sub-attachments for the year of publication) include some editorial selection based on relevance and availability. More? References | Discussion page | Log Searches | 2019 References | 2020 Reference Search Term: Blastocyst Development | Blastocist | Blastocoel | Internal cellular mass | | Trophectoderm Older Papers These papers originally appeared in the table Some recent findings, but as this list has grown to length, they have now been shuffled down to this broken down table. See also the discussion page for other references listed by year and references to that current page. Asymmetric division of shrinking cell positioning of cell domains and fate specification[8] During the development prior to mammalian implantation, the embryo is only organized into a blastocyst consisting of an epithelial layer that encapsulates the inner mass cell (ICM), which causes all embryonic tissues. In mice, targeted cell division, acolybatic polarity and actomyosine contraction contributed to the formation of ICM. However, it remains unclear how these processes work together. Here we show that asymmetric segregation of apical domains creates blastomeres with different contractuality, triggering their classification into internal and internal positions. Oct4 is required for lineage in the development of the internal cell mass of the blastocyst mouse[9] The oct4 transcription factor is required in vitro for the establishment and maintenance of embryonic stem cells and for the reprogramming of somatic cells to pluripotence. In vivo, it prevents ectopic differentiation of the early embryo into tropoblast. Here we further explore the role of Oct4 in the formation of blastocyst and the specification of epiblast compared to primitive endoderm lines using conditional genetic deletion. Experiments involving mouse embryos, which are deficient for both the uterine and zygotic Oct4, suggest that this can be used to create zygot, early cleavage and activate nanog expression. Nanoga proteins are significantly elevated in the purported internal cellular mass of Oct4 null embryos, indicating an unexpected role for Oct4 in reducing Nanog levels that may be relevant for differentiation in priming differentiation during epiblastration. In-order erasure of oct4 during the transition of the morule to blastocist interferes with the ability of internal cellular mass cells to adopt a linear-specific identity and gain a molecular profile epiblast or primitive endorma. Sox17, a marker of primitive endorma, is not detected by the long-term culture of such embryos, but can be solved by providing exogenous FGF4. Interestingly, functional primitive endoderm can be solved in Oct4-deficiency embryos in complementary embryos, but only if the hosts of the embryos are at the pre-blastocist stage. We conclude that decisions on the fate of cells within the internal cell mass depend on Oct4 and that oct4 is not independent to distinguish primitive endorma derivatives until an appropriate developmental environment is established. Non-invasive imaging of a human embryo prior to embryo activation predicts development in the blastocyst phase[10] Studies of pre-implantation of human embryo development have been reported, which correates image analysis at times and profiling of genetic expression. By studying a large set of in vitro fertilisation (IVF) studies, success in progression to the blastocyst phase can be predicted with >93% sensitivity and specificity by measuring three dynamic, non-invasive imaging parameters after day 2 after fertilisation, before the activation of the embryo genome (EGA). The expression of the blastocyst gene is associated with the potential of implantation[11] Compared to the blastocysts that caused healthy foetal development, blastocysts that do not rectal (negative) showed that the b3gnt5 i Eomes gene was smeared, a blastocyst that resulted in spontaneous loss of pregnancy (absorption) showed a decrease in the Wnt3a i Eomes gene. FGF signal-dependent segregation of primitive endorma and epiblastic in the mouse blastocyst[12] Primitive endoderm (PE) and epiblast (EPI) are two lines derived from the internal cell mass (ICM) of the E3.5 blastocyte. Recent studies have shown that epi and pe progenitors, which express lineano-specific transcrypral factors Nanog and Gata6 respectively, gradually occur with the development of ICM. ... In conclusion, we propose a model in which the stochastic and progressive specification of EPI and PE lineage occurs during the maturation of the blastocyst on a signal-dependent FGF/MAP. Movies Human Blastocyst Model Development Morula Model Page | Play blastocist model page | Play Movies Recent #pmid28681376| PMID28681376}} of the initial composition of the morule to blastocyst, based on animal models, provides important mechanical steps: Compaction - morula blastomeres packing tightly (microfilamental cytoskeleton) Cleavage level - spindle direction of dividing cells (mitoza). Polarization - blastomeres apico-basal (Hippo pathway, Yes-associated protein (Yap) Cavitation - blastokoel formation with enlargement cycles and cavity collapse. epiblast cells - contact polar trophectoderm primitive endoderm - facing the cavity Formation of human blastocyst Below table shows changes in development of human blastocyst in vitro within week 1.[13] With the designation blastist blastococist Blastocist blastocist blastocist blastocist blastocist blastocist blastocist blastocist from the pellucida (human) Model Human Blastocyst Development The next figure is from a recent study[10] using video and genetic analysis of human development in vitro within 1 week of fertilization. EGA - embryonic activation of the EUSEF genome - embryo phase specific sample, four unique embryonic phase-specific samples (1-4) Links: Image with legend Mouse Blastocyst Gen Expression General patterns of genetic expression are indicated from genomic profiling. [15] red - loss of maternal mRNAs green - activation of the embryonic genome (EGA) purple - maternal gene activation (MGA) orange - continuous expression Internal cell mass Human Blastocyst (day 5)[1] The mass of the nud cells forms the inner layer of the larger cell you are with your embryoblast is a cluster of cells located on one wall of the tropoblast layer. In week 2, this mass will vary into two different layers of epiblast and hypoblast. Hypoblast (or primitive endoderm) is a transient epithelial layer facing blastocoel, replacing it within three weeks with endoderm cell gastrulation. The epiblastic layer will form the entire embryo and within three weeks undergo gastrulation to form 3 sprouts of the layer. It also forms an epithelial layer that padding the amniotic cavity. Trophectoderm Trophectoderm (TE) is also called the trophoblast epithelial, which will later form a key component of the placenta. A key early function is to transport sodium (Na+) and chloride (Cl-) ions through this layer into blastocol. Later in week 2, this layer will differentiate into two different trofoblast layers, the cells of syncitiotrofoblast and cytotrofoblast and are key to implantation and early placenta. The early layer differentiation has been shown to be governed by the transcription factors Tead4[16] and then homeobox 2 (Cdx2) associated with Caudal. Links: trofoblast | OMIM -Tead4 | OMIM - Cdx2 Blastocoel Mouse - blastocoel formation[15] trophectoderm transports Na+ and Cl-ions through this layer in blastocoel creates an osmotic gradient of the driving fluid across this epithelial separate apical and basolateral membrane Domain Specific for transport facilitates transepitelni Na+ i transport fluid for blastocoel formation transport commutes Na, K-adenosine triphosphatase (ATPase) u basaltic membranes trophectoderma [17] Mishide blastocist GLUT8 term. [18] During the blastocyst phase, mammalian metabolism switches to anaerobic metabolism of glycolysis to meet the metabolic requirements of the growing blastocyst and the formation of blastocool. This is expected to be driven by an integral membrane protein family of glucose-relieved transporters (GLUT or SLC2A). aerobic - oxidation of lactate and pyruvate in the citric acid cycle (Krebs cycle) and oxidative phosphorylicylcose-converting glucose Piruvat GLUT - GLUcose Transporter (divided into 3 classes I-III) SLC2 - Solute Carrier Family 2 Glut transporter glut1 - from zygot to blastocyst. (all mammalian tissues, basal glucose withdrawal) GLUT2 and GLUT3 - from the late eight cell levels to the blastocyst. (GLUT2, beta cells of the liver and pancreas; glut3, all mammalian tissues, basal glucose uptake) GLUT4- not expressed. (muscle and adipose tissue) GLUT8 - up-regulated in the blastocyst phase. (central nervous system and heart) (Data mainly from mouse development, expression of adult tissues shown in parentheses) Mouse study,[18] showed that GLUT8 is up-regulated after stimulation of insulin, although the recent glut8 knockout mouse shows normal early embryo development in the absence of this transporter. [19] Links: Biochemistry - glucose transporters | GLUT1 | GLUT2 | GLUT8 Blastula Cell Communication Two types of cell junctions have been identified in different regions in the development of blastocyst. The close intersections, located near the outer surface, create a leak, insulating the inside of the embryo from the external medium. The gaps allow for electrical compression of the epithelial cells that surround the fluid-filled cavity. Adhesion EM Images: GIT EPITHELIUM EM1 | GIT epithelium EM2 | GIT epithelium EM3 | Desmosome EM Adhesion Cartoons: Close Intersection | Adherens junction | Desmosome | Gap junction blastocyst flap - zona pellucida lost, ZP has a place of sperm entry, and the whole of the P.K. is broken down by the secretion of the uterus and possibly the secretion of the blastula. Uterine glands - sections needed for blastocist motility and nutrition Links: MBoC Figure 21-69. Blastula Blastocyst flap Around the fifth day, a human blastocist hatches from the protective zone of pellucida. This ripple allows for increased growth, access to secretion of uterine nutrients and blastocyst adhesion to the uterus lining. Associated with this hatching process are a series of physical shrinkages. In blastocyst, the reductions after the formation of blastogol are repeated, and the frequency of brushes is higher during the wave season than in the periods before and after hatching. [20] Interestingly, the same researchers in this mouse study suggest that weaker contractions (less than a 20% decrease in volume) as opposed to strong brushes (20% or more of volume reduction) have the opposite effect of inhibition. In the mouse model, the defined areas of the zone pellucida shedding different (24% mural site, 24% internal cell mass site, 17% equatorial site, and 35% of other sites). [21] Links: Blastocyst Day 5-6 Movie <mediaplayer width='500' height='450' image= amp;gt;File:Human_blastocyst_day_5-6.mp4<mediaplayer> Human blastocyst contractions (day 5-6)[10] Molecular factors TEA DNA-domain binding, These factors are binding on the TEA/ATTS cognate binding site[22] TEF-3 - renamed u Tead1 i Tead4 Tead3 - expressed u syncytiotrophoblasts E-cadherin - Calcium ion dependent cell adhesion molecule, cell membrane adhesive proteins needed for morula compaction epithin - A type II transmembrane serine prosthesis, found in the mouse to reproduce morule during embryo preimplantation. Expressed from the 8-cell phase in contacts with blastomer and co-localism in moruli with E-kadherin. [23] Na, K-adenosine triphosphatase - Sodium potassium pump, which generates osmotic gradient for fluid flow u blastokoel Zonula occludens-1 - (ZO-1) Close suspent proteins u moruli do blastocista Transformation u mouse [24] Blastocist u Other species Mouse Blastocist Early gene expression[25] Early gene expression[25] Early gene expression[25] Early gene expression[25] Early mouse development model[26] Links: Mouse Development Bovine Blastocist KRT18 , FN1 i MYL6 term Bovine blastocist KRT18 i MYL6 term Linkovi: Cattle Development Reference ↑ 1.0 1.1 Zhang P, Zucchelli M, Bruce S, Hambiliki F, Stavreus-Evers A, Levkov L, Skottman H, Kerkelä E, Kere J & Hovatta O. (2009). transcription profiling of development prior to human implantation. PLOS 1, 4, e7844. PMID: 19924284 DOI. ^ Sasaki H. (2015). The position- and polarity-dependent Hippo signaling regulates cellular destiny in the pre-implantation of mouse embryos. Semin. Cell Dev. Biol. 47-48, 80-7PMID: 25986053 DOI. ^ Rayon T, Menchero S, Nieto A, Xenopoulos P, Crespo M, Cockburn K, Cañon S, Sasaki H, Hadjantonakis AK, de la Pompa JL, Rossant J & Manzanares M. (2014). Zabok and hippo converg on Cdx2 to determine the trophectoderm lineage in the mouse blastocist. Dev. Cell, 30, 410-22ND PMID: 25127056 DOI. ^ Smith HL, Stevens A, Minogue B, Sneddon S, Shaw L, Wood L, Adeniyi T, Xiao H, Lio P, Kimber SJ & Brison DR. (2019). Systemic analysis of human embryos and genetic networks involved in cell line allocation. BMC Genomics, 20, 171st PMID: 30836937 DOI. ^ 5.0 5.1 Nissen SB, Perera M, Gonzalez JM, Morgani SM, Jensen MH, Sneppen K, Brickman JM & Trusina A. (2017). Four simple rules that are sufficient to create a vacuum cleaner blastocyst. PLOS Biol. 15, e2000737. PMID: 28700688 DOI. ^ Gerovska D & Araúzo-Bravo MJ. (2019). Computational analysis of data on single-celled pre-implants elucids the stabilization of the term Oct4 in the brood of mouse pre-inmplantation E3.25. Sci Rep., 9, 8930. PMID: 31222057 DOI. ^ Pillai VV, Siqueira LG, Das M, Kei TG, Tu LN, Herren AW, Phinney BS, Cheong SH, Hansen PJ & Selvaraj V. (2019). Physiological profile of non-differentiated bovine blastocyst trophoblasts. Biol Open, 8. PMID: 30952696 DOI. ^ Maître JL, Turlier H, Illukkumbura R, Eismann B, Niwayama R, Nédélec F & Hiiragi T. (2016). Asymmetric division of contracted domains pairs positioning cells and specification of fate. Nature, 536, 344-348. PMID: 27487217 DOI. ^ Le Bin GC, Muñoz-Descalzo S, Kurowski A, Leitch H, Lou X, Mansfield W, Etienne-Dumeau C, Grabole N, Mulas C, H, Hadjantonakis AK & Nichols J. (2014). Oct4 is required for the line priming in the development of the inner cell mass of the mouse blastocist. Development, 141, 1001-10. PMID: 24504341 DOI. ^ 10.0 10.1 10.2 Wong CC, Loewke KE, Bossert NL, Behr B, De Jonge CJ, Baer TM & Reijo Pera RA. (2010). Non-invasive imaging of the human embryo before the activation of the embryo genome predicts development in the blastocyst phase. Bionoeil. 28, 1115-21. PMID: 20890283 DOI. ^ Parks JC, McCallie BR, Janesch AM, Schoolcraft WB & Katz-Jaffe MG. (2011). Blastocist correlated genetic expression with implantation potential. Fruitful. I'm going to have to take a look at 95, 1367-72 PMID: 20864103 DOI. ^ Yamanaka Y, Lanner F & Rossant J. (2010). FGF signaling the segregation of primitive endorma and epiblasts in the mouse blastocist. Development - 137, 715-24. PMID: 20147376 DOI. ^ Fong CY & Bongso A. (1999). Comparison of the rates of explosion of humans and the total number of cells in successive culture media with and without coculture. Hum, reprod. 14, 774-81. PMID: 10221713 ↑ Tanaka N, Takeuchi T, Neri QV, Sills ES & Palermo GD. (2006). Laser-based dissect of blastocyst and later production of embryos in serum/free cell culture system: applications and preliminary results in the murine model. J Transl Med, 4, 20th PMID: 16681851 DOI. ^ 15.0 15.1 Bell CE, Calder MD & Watson AJ. (2008). Genomic profiling of RNA and a program that oversees the development of pre-implantation mammals. Mol. Hum. Mr. Reprod, i'm sorry. 14, 691-701 PMID: 19043080 DOI. ^ Nishioka N, Yamamoto S, Kiyonari H, Sato H, Sawada A, Ota M, Nakao K & Sasaki H. (2008). Tead4 is required to specification trophectoderm in pre-implantation mouse embryos. Mech. Dev. 125, 270-83 PMID: 18083014 DOI. ^ Kidder GM & Watson AJ. (2005). Roles at K-ATPase in early development and trophectoderm of differentiation. Semin. Nefrol. , 25, 352-5 PMID: 16139691 DOI. ^ 18.0 18.1 Carayannopoulos MO, Chi MM, Cui Y, Pingsterhaus JM, McKnight RA, Mueckler M, Devaskar SU & Moley KH. (2000). GLUT8 is the glucose transporter responsible for insulin stimulated glucose in the blastocyst. Proc. Natl, i'm sorry. Acad, i'm sorry. Sci. U.S.A. , 97, 7313-8 PMID: 10860996 ↑ Membrez M, Hummler E, Beermann F, Haefliger JA, Savioz R, Pedrazzini T & Thorens B. (2006). GLUT8 is used for embryonic development, but affects hippocampal neurogenesis and heart function. Mole, cell. Biol. 26, 4268-76 PMID: 16705176 DOI. ^ Yamazaki K & Kato Y. (1989). Areas of the pellucida zone, which is spilled with mouse embryos, except muran trophectoderm. J. Exp. Zoological. 249, 347-9PMID: 2708952 DOI. ^ Jacquemin P, Hwang JJ, Martial JA, Dollé P & Davidson I (1996). New family of developmentally regulated mammalian transcription factors containing the TEA/ATTS DNA binding domain. J. Biol. Chem. 271, 21775-85. PMID: 8702974 ↑ Khang I, Sonn S, Park JH, Rhee K, Park D & Kim K. (2005). Expression of epithelial in the development of pre-implantation of mice: its functional role in Dev. Biol. 281, 134-44 PMID: 15848395 DOI. ^ Wang H, Ding T, Brown N, Yamamoto Y, Prince LS, Reese J & Paria BC. (2008). Zonula occludens-1 (ZO-1) participates in moruli to blastocist transformation in mouse. Dev. Biol. 318, 112-25. PMID: 18423437 DOI. ^ 25.0 25.1 25.2 25.3 25.4 Keramari M, Razavi J, Ingman KA, Patsch C, Edenhofer F, Ward CM & Kimber SJ. (2010). Sox2 is essential for the formation of trophectoderma in the embryo before embryos. PLOS 1, 5, e13952. PMID: 21103067 DOI. ^ Krupinski P, Chickarmane V & Peterson C. (2011). Simulating a mammal blastocyst-- molecular and mechanical interactions of the sample of the embryo. Plos computer. Biol. , 7, e1001128. PMID: 21573197 DOI. Comments: Maître JL. (2017). Biol. Cell, 109, 323-338. PMID: 28681376 DOI. Rasmussen TP & Corry GN. (2010). Epigenetic prior sampling and dynamics in the initial stages of mammalian predimplantation development. J. Cell. Fiziol. 225, 333-6. PMID: 20607796 DOI. Cockburn K & Rossant J. (2010). Making blastocyst: lessons from the mouse. J. Clin. Invest. , 120, 995-1003. PMID: 20364097 DOI. Rossant J. (2007). Stem cells and development in the mammalian blastocyst. Reproduction, fertility. Dev. 19, 111-8. PMID: 17389140 Articles Smith HL, Stevens A, Minogue B, Sneddon S, Shaw L, Wood L, Adeniyi T, Xiao H, Lio P, Kimber SJ & Brison DR. (2019). Systemic analysis of human embryos and genetic networks involved in cell line allocation. BMC Genomics, 20, 171st PMID: 30836937 DOI. Santos J, Pereira CF, Di-Gregorio A, Spruce T, Alder O, Rodriguez T, Azuara V, Merkenschlager M & Fisher AG. (2010). Differences in the epigenetic and reprogramtic properties of pluripotent and extra-germ stem cells involve the rearrangement of chromatine as an important early event in the development of the mouse embryo. Epigenetics Chromatain, 3, 1st PMID: 20157423 DOI. Dzamba BJ, Jakab KR, Marsden M, Schwartz MA & DeSimone DW. (2009). Cadherin adhesion, tissue tension and noncanonical Wnt signaling are regulated by fibronectin matrix organization. Dev. Cell, 16, 421-32. PMID: 19289087 DOI. Sheth B, Nowak RL, Anderson R, Kwong WY, Papenbrock T & Fleming TP. (2008). Tight compressed protein ZO-2 expression and relative function of ZO-1 and ZO-2 during the formation of the mouse blastocyst. Exp. Cell Really. , 314, 3356-68. PMID: 18817772 DOI. Nishioka N, Yamamoto S, Kiyonari H, Sato H, Sawada A, Ota M, Nakao K & Sasaki H. (2008). Tead4 is required to specification trophectoderm in pre-implantation mouse embryos. Mech. Dev. 125, 270-83 PMID: 18083014 DOI. Yamanaka Y, Ralston A, Stephenson RO & Rossant J. (2006). Cellular and molecular arrangement of the mouse blastocyst. Dev. Dyn. , 235, 2301-14. PMID: 16773657 DOI. Search PubMed Search April 2010 Search Pubmed: blastocist development | blastokoel development | development of internal cell mass | trophectoderm | Glossary Links Glossary: A | B | C | D | E | F | G | H | I | J | K | L | M | N | About | P | Q | R | S | T | U | V | W | X | Y | Z Numbers | Symbols | Term Link Let's list this page: Hill, M.A. (2020, December 3) Embryology Blastocyst Development. Retrieved from What links here? © Dr Mark Hill 2020, Embryology UNSW ISBN: 978 0 7334 2609 4 - UNSW CRICOS Provider Code No. 00098G 00098G