

Society for Developmental Biology 63rd Annual Meeting
University of Calgary, Alberta, Canada
July 24-28, 2004

Organizing Committee: Doug Melton (Chair), Marnie Halpern, Richard Harland, Judith Kimble, James McGhee, Andy McMahon, Janet Rossant

Local Organizers: Leon Browder, James McGhee

Numbers in *Italics* are program abstract number.

Saturday, July 24

12-6 PM Meeting Registration MacEwan Hall Foyer
 Poster Session I and Exhibits Set-up MacEwan Ballroom

3:15-5:30 PM Concurrent Workshops on Technological Advances

Workshop 1: *Transgenics and Imaging* Science Theatre 140

Chair: Scott Fraser, Caltech

- 1*** 3:15 Imaging the patterning of the vertebrate embryo. S.E. Fraser. Caltech, Pasadena, CA.
2 3:45 Technicolor mice: tools for investigating mammalian development. A-K. Hadjantonakis. Sloan-Kettering Institute, New York, NY.
3 4:15 Marking cell lineages. A. Nagy. Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto, Canada.
4 4:45 Monitoring synapses in fluorescent mice. J.W. Lichtman. Harvard Univ., Cambridge, MA.
 5:15 Discussion

Workshop 2: *Genomics, Proteomics and Bioinformatics* Science Theatre 148

Chair: Janan Eppig, Jackson Labs.

- 5*** 3:15 Development, phenotypes, and disease: the challenge of integrating complex data. J.T. Eppig. The Jackson Laboratory, Bar Harbor, ME.
6 3:45 Genome-wide discovery of transcription units and functional elements in Arabidopsis. J.R. Ecker. The Salk Institute, La Jolla, CA.
7 4:15 Genomic approaches to the identification of the genetic bases of phenotypic variation. M. Morgante. Università di Udine, 33100 Udine, Italy.
8 4:45 Highthroughput RNAi screens in *Drosophila* cells. N. Perrimon. Harvard Medical School, Boston MA, Howard Hughes Medical Institute, Chevy Chase MD.
 5:15 Discussion

5:30-7 PM Dinner Dining Centre

7-9 PM Presidential Symposium MacEwan Hall

Developmental Biology and Human Health

Chair: Doug Melton, Harvard U.

- 9*** 7:00 Two medical challenges for the developmental biologist. M.C. Fishman, J. Porter. Novartis Institutes for BioMedical Research, Cambridge, MA; Harvard Medical School, Boston, MA.
10 7:40 Directing the differentiation of ES cells: Insights from neural development. H. Wichterle, T.M. Jessell. HHMI/Columbia Univ., NY.
 8:20 Skin stem cells: biology, development and promise. E. Fuchs. Rockefeller Univ., New York, NY

9-11 PM Opening Reception, Poster Session I and Exhibits

MacEwan Ballroom

Please see Poster Session assignments in the end of the Program

Sunday, July 25

8AM-5PM

Meeting Registration

MacEwan Hall Foyer

8-8:45 AM Funding Opportunities in Developmental Biology

Science Theatre 140

Moderator: Ida Chow, SDB

Presenters: Representatives of NIH, NSF, ACS, MOD and other funding agencies

9 AM-12 PM Concurrent Symposia Session I

In addition to the invited speakers' 25 min presentations, abstracts will be selected from submissions for 15 min short talks.

Symposium 1: *Genetic Network during Development*

Science Theatre 140

Chair: Mike Levine, U. C. Berkeley

9:00 Genetic networks underlying gastrulation in *Drosophila*. M. Levine. Univ. of California, Berkeley, CA

11 9:25 Control of the *Drosophila* cellular immune response to parasitization. A. Vincent, M. Crozatier, J. Ubeda, M. Meister. Centre of Developmental Biology, CNRS/Univ. Toulouse, France; IBMC, CNRS, Strasbourg, France.

12 9:40 Regulation of segmental patterning in *Xenopus* embryos. C.R. Kintner, T. Moreno. Salk Institute, San Diego, CA.

13 10:05 Function and expression of the proprotein convertase amontillado during *Drosophila* growth and development. M. Bender, S. Jocoy, L. Rayburn. Univ. of Georgia, Athens, GA.

10:20 Coffee break

14 10:35 Combinatorial control of gene expression during organ development in *C. elegans*. H.M. Chamberlin, H. Jia, R.W. Johnson, V. Rajakumar, S.F. Sleiman, R. Tseng, X. Wang, G. Zhang. Ohio State Univ., Columbus, OH.

15 11:00 Genetic network controlling blood cell development in *Drosophila*. R.A. Schulz, R.P. Sorrentino, J. Lee, K. Gajewski. MD Anderson Cancer Ctr., Houston, TX.

16 11:15 *amfos* is a new gene required for Fos function during *Drosophila* development. J.R. Riesgo-Escovar, N.O. Nazario-Yepiz, T. Peña-Rangel, L.M. Salgado-Rodriguez. Mexican National Autonomous Univ. (UNAM), Querétaro 76230, México; CINVESTAV, México, D. F., México.

11:30 Wnt signaling in induction of the mammalian genitourinary system. A. McMahon. Harvard Univ., Boston, MA

Symposium 2: *Patterning*

Science Theatre 148

Chair: Marnie Halpern, Carnegie Institution of Washington

9:00 Exploring molecular left-right differences in the zebrafish brain. M. Halpern. Carnegie Institution of Washington, Baltimore, MD

17 9:25 To degrade or not to degrade: Regulation of GLH protein levels. A.M. Orsborn, W. Li, K.L. Bennett. Univ. of Missouri, Columbia, MO.

9:40 Splicing-dependent localization of oskar mRNA controls posterior patterning of the *Drosophila* embryo. A. Ephrussi. EMBL, Germany.

18 10:05 *abd-A* regulates the specification and the differentiation of the genital disc in *Drosophila melanogaster*. A.E. Christiansen, B.S. Baker. Stanford Univ., Stanford, CA.

10:20 Coffee break

19 10:34 Regulation of developmental timing in plants by miRNAs. S. Poethig, C. Hunter, M. Park, A. Peragine, G. Wu, M. Yoshikawa. Univ. of Pennsylvania, Philadelphia, PA.

20 11:00 miRNAs specify dorsoventral polarity during leaf development. M. Juarez, M. Timmermans. Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.

21 11:15 WNT regulation of myogenesis requires PKA and CREB. A. Chen, D. Ginty, C. Fan. Carnegie Inst. of Washington, Baltimore, MD; JHU Sch. of Med., Baltimore, MD.

22 11:30 Segmental patterning of the vertebrate axis. O. Pourquié. Stowers Institute for Medical Research, Kansas City, MO

12-1 PM Lunch

Dining Centre

1-5 PM Education Symposium

1-3:30 PM **Plenary Session**

MacEwan Hall

Strategies for Improving Undergraduate Education in Biology

Chair: Bill Wood, U. Colorado-Boulder

1:00 John Bransford, U Washington, Seattle, WA

How people learn

23 1:45 The scientific teacher: approaching teaching with a research mindset. B. Wood. Univ. of Colorado-Boulder, CO.

24 2:10 Creating tools for education and scientific visualization. C.R. Phillips. Bowdoin College, Brunswick, ME.

25 2:35 Evolving effective courses and curricula through the Biology Concept list (BCL) and inventory (BCI). M.W. Klymkowsky, K. Garvin-Doxas. U. Colorado, Boulder CO.

26 3:00 Issues in undergraduate science education; A national perspective. R.L. DeHaan. Emory Univ., Atlanta, GA.

3:30-3:45 PM Coffee Break at Posters

3:30-4:15 PM **Posters, Information Booth and Demos**

MacEwan Ballroom

Please see Poster Session assignments in the end of the Program

4:15-5 PM **Plenary Session**

MacEwan Hall

Viktor Hamburger Outstanding Educator Prize Lecture

4:15 Bill Wood, SDB Professional Development & Education Cmt. Chair - Award presentation

27 4:20 Developmental Biology: The study of life in four dimensions. L. Browder. Univ. of Calgary, Alberta, Canada.

5-6 PM Meet the SDB Board of Directors – Reception for Students and Postdoctoral Fellows

5-7 PM Dinner

Dining Centre

7-9 PM Plenary Session I

MacEwan Hall

Homeoboxes - Twenty years on, how do they explain development?

Chair: Cecilia Moens, U Washington

7:00 Hox gene expression in the zebrafish: Setting the limits. C. Moens. Univ. of Washington, Seattle, WA.

28 7:30 Homeobox genes in *Arabidopsis* and their epigenetic regulation. M. Byrne, C. Kidner, R. Martienssen. Cold Spring Harbor Lab, Cold Spring Harbor, NY; John Innes Center, Colney Lane, Norwich UK.

29 8:00 Hox genes and the vertebrate hindbrain: A story in segments. R. Krumlauf. Stowers Institute, Kansas City, MO.

8:30 Hox genes: From body plan to neuropsychiatric disorders. M. Capecchi. U. of Utah, Salt Lake City, UT.

9-11 PM

Poster Session I and Exhibits

MacEwan Ballroom

Please see Poster Session assignments in the end of the Program
Poster tear down at the end of session.

Monday, July 26

8AM-5PM

Meeting Registration

MacEwan Hall Foyer

8-8:45 AM

Tutorial – TBA

9 AM-12 PM

Concurrent Symposia Session II

In addition to the invited speakers' 25 min presentations, abstracts will be selected from submissions for 15 min short talks.

Symposium 3: *Evo-Devo*

Science Theatre 140

Chair: Brian Hall, Dalhousie U., Canada

- 30** 9:00 Why should devo care about evo-devo?. B.K. Hall. Dalhousie Univ., Halifax NS.
31 9:25 The evolution of arthropod pattern formation. N.H. Patel. UC Berkeley and HHMI.
32 9:50 Evidence from sponges and jellyfish of early evolution of sensory gene families - data from *Six* genes. D.K. Jacobs. UCLA, Los Angeles, CA.
33 10:05 *Nematostella*: A model outgroup for bilaterian evolution. P.M. Burton, K. Pang, C. Krone, M.Q. Martindale, J. Finnerty. Boston Univ., Boston, MA; Univ. of Hawaii, Honolulu, HI
10:20 Coffee break
34 10:35 The choanoflagellate transcriptome: insights into animal origins and evolution. N. King. Dept. of Molec. & Cell Biol. and Dept of Integ. Biol., Univ. of California, Berkeley, CA.
35 11:00 Evolution of development: A view from the cavefish eye. B. Jeffery. Univ. of Maryland, College Park, MD.
36 11:25 Regulation of divergent *RX* genes in vertebrate eyes. T.J. Bailey, M. Jamrich. Baylor College of Med., Houston, TX.
37 11:40 Axial patterning in fishes. A.B. Ward, E.L. Brainerd. Univ. of Mass. Amherst, MA

Symposium 4: *Tissue and organ development*

Science Theatre 148

Chair: James McGhee, U Calgary, Canada

- 38** 9:00 The transcription factor network regulating development of the *Caenorhabditis elegans* intestine. J.D. McGhee. Univ. of Calgary, Calgary, Alberta.
39 9:25 Genome-wide analysis of foregut development. S.E. Mango, P. Smith, W. Ao, J. Gaudet, S. Muttumu, C. Armstrong, M. Vidal, J. Kent. Huntsman Cancer Institute, Univ. of Utah, Salt Lake City, UT; Dana-Farber Cancer Institute and Dept. of Genetics, Harvard Medical School, Boston, MA; Genome Bioinformatics Group, Univ. of California at Santa Cruz, CA.
40 9:50 Development of a novel gut culture system to analyse the influence of genes on intestinal epithelial growth and differentiation. H.E. Abud, J.K. Heath. Ludwig Institute for Cancer Research, Melbourne, Vic 3050, Australia.
41 10:05 Sox17 and beta-catenin in *Xenopus* endoderm specification. A.M. Zorn, D. Sinner, S. Rankin, M. Lee. Cincinnati Childrens Hospital, Div. of Developmental Biology, Cincinnati, OH.
10:20 Coffee break
10:35 Endodermal organ development in zebrafish. D. Stainier. Univ. of California, San Francisco.
42 11:00 Pancreas specification and lineage diversification: Control by the Pdx1 and Ptf1a transcription factors. C. Wright, Y. Fujitani, Y. Kawaguchi, B. Cooper, S. Fujitani, M. Gannon, D. Boyer. Vanderbilt Univ. Program in Developmental Biology; Dept. of Cell and Developmental Biology, Nashville, TN

- 43** 11:25 Transcriptome analysis of transcription factor expression in developing organs: Defining a pancreas-specific code. J. Jensen, A. Kutchma. U. Colorado HSC, CO.
- 44** 11:40 Coupling of polarized extension to the establishment of planar cell polarity in the developing mammalian auditory sensory organ. P. Chen, N. Segil, A. Collazo, X. Lin. Departments of Cell Biology and Otolaryngology, Emory Univ., Atlanta, GA; House Ear Institute, Los Angeles, CA.

12-1 PM Lunch Dining Centre

1-3 PM Poster Session II and Exhibits MacEwan Ballroom
Please see Poster Session assignments in the end of the Program

2:30-3 PM SDB Business Meeting MacEwan Hall

3-3:15 PM Coffee Break at Posters

3:15-5:30 PM Award Lectures MacEwan Hall

3:15-3:50 ***E. G. Conklin Medal***

Judith Kimble, SDB President-elect - Award presentation to Matt Scott

45 Matt Scott, Stanford University, CA – Award lecture
Developmental biology and cancer

3:55-4:40 ***Elsevier-SDB Lifetime Achievement Award***

Doug Melton, SDB President - Award presentation to Joe Gall

Joe Gall, Carnegie Institution of Washington, MD – Award lecture
The egg and I

4:40-5:30 ***Eli Lilly-FASEB Excellence in Science Award***

Eli Lilly-FASEB Representative – Award presentation to Janet Rossant

Janet Rossant, U. Toronto, Canada – Award lecture
Manipulating mouse development- from cells to genes and back again

5:30-7 PM Dinner Dining Centre

7-9 PM Plenary Session II MacEwan Hall

Role of microRNAs in development

Chair: Craig Hunter, Harvard

7:00 Intercellular RNA transport. C. Hunter. Harvard Univ, Cambridge, MA

46 7:30 Plant development: Insights from microarrays and microRNAs. D. Weigel. Max Planck Institute for Developmental Biology, D-72076 Tübingen, Germany.

47 8:00 SiRNAs targeting an intronic transposon in the regulation of natural flowering behavior in *Arabidopsis*. X. Chen, J. Liu, Y. He, R. Amasino. Waksman Institute, Rutgers Univ., Piscataway, NJ; Dept. of Biochemistry, Univ. of Wisconsin, Madison, WI.

8:30 Exploring the roles of microRNAs in vertebrate development. C. Tabin. Harvard Univ., Cambridge, MA

9-11 PM Poster Session II and Exhibits MacEwan Ballroom

Please see Poster Session assignments in the end of the Program

Tuesday, July 27

8 AM-5 PM Meeting Registration MacEwan Hall Foyer

8-8:45 AM

Tutorial – TBA

9 AM-12 PM Plenary Session III

MacEwan Hall

Stem cells

Chair: John Gurdon, Cambridge, U.K.

48 9:00 Nuclear reprogramming by *Xenopus* oocytes. J.B. Gurdon, S. Simonsson, J.A. Byrne. Wellcome/CR UK Gurdon Institute, Univ. of Cambridge, UK; Oregon Hlth. and Science Univ., OR.

49 9:25 Nuclear cloning, stem cells and reprogramming of the genome. R. Jaenisch, K. Hochedlinger, R. Blelloch, K. Eggan. Whitehead Inst for Biomed Res and Dept of Biol, MIT; Dept of Molec and Cell Biol, Harvard U., Cambridge, MA

9:50 Germ line stem cell development in *Drosophila*. R. Lehmann. Skirball Inst./NYU, New York

10:15 Coffee break

10:30 Control of germline stem cells in *C. elegans*. J. Kimble. Univ. of Wisconsin-Madison, WI

10:55 Role of Wnt proteins in stem cell control. R. Nusse. Stanford Univ., CA

11:20 Comments. D. Melton. Harvard Univ., Cambridge, MA

12-1 PM

Lunch

Dining Centre

1-3 PM

Poster Session II and Exhibits

MacEwan Ballroom

Please see Poster Session assignments in the end of the Program

Poster and exhibits tear down at the end of the session

3-3:15 PM

Coffee Break

3:15-6:00 PM

Concurrent Symposia Session III

In addition to the invited speakers' 25 min presentations, abstracts will be selected from submissions for 15 min short talks.

Symposium 5: *Emerging organisms*

Science Theatre 140

Chair: Billie Swalla, U. of Washington

3:15 Moss: an experimental system to study the evolution of developmental processes. R.

Quatrano. Washington Univ., St. Louis, MO

50 3:40 Neural regeneration and germ cell specification in planarians. P.A. Newmark, F. Cebria, R.M. Zayas, T. Guo, J. Stry. Dept. of Cell and Structural Biology; Neuroscience Program, Univ. of Illinois at Urbana-Champaign, Urbana, IL.

51 4:05 *Ascaris suum* as a comparative and complementary model system: revisiting a historical giant. S. Lall, A. Fernandez, F. Piano, R. Davis. CUNY Graduate Ctr., New York, NY; NYU Dept. of Biology, NY.

52 4:20 Gonadogenesis in *P. pacificus* and the comparative development of organs. D.J. Rudel, M. Riebesell, R. Sommer. Max-Planck Institut für Entwicklungsbiologie, Dept. Evolutionary Biology, Tübingen, Germany.

53 4:35 Development of polarized two-cell syncytia during oogenesis in polychaete worms of the genus *Ophryotrocha*. J.L. Brubacher, E. Huebner. Dept. of Zoology, Univ. of Manitoba, Winnipeg, MB, Canada.

54 4:50 Genetic basis of limb reduction in sticklebacks. M.D. Shapiro, M. Marks, C. Peichel, D. Schluter, D. Kingsley. HHMI and Stanford Univ.; Hutchinson Cancer Research Ctr.; Univ. of British Columbia.

55 5:05 Retinoic acid, Hox genes and rostrocaudal patterning of amphioxus embryos. L.Z. Holland, M. Schubert, V. Laudet, N.D. Holland. Univ. of California San Diego, La Jolla, CA; Lab. de Biol. Mol. de la Cellule, 69364 Lyon Cedex 07, France.

56 5:30 Evolution of chordates: Worms or squirts?. B.J. Swalla. Univ. of Washington and Friday Harbor Laboratories, Seattle, WA.

Symposium 6: *Agonists and Antagonists in Development*

Science Theatre 148

Chair: Richard Harland, U.C. Berkeley

- 57** 3:15 Interactions between the FGF and ephrinB1 signaling pathways regulate the morphogenetic movements underlying eye field formation. S.A. Moody, K.B. Moore, K. Mood, I.O. Daar. The George Washington Univ., Washington, D.C.; National Cancer Institute-Frederick, NIH, Frederick MD.
- 3:40 BMP antagonists in development. R. Harland. Univ. of California, Berkeley.
- 58** 4:05 Bone morphogenetic protein antagonists play multiple roles in mammalian forebrain and craniofacial midline development. J. Klingensmith, R. Anderson. Dept. of Cell Biology, Duke Univ. Medical Ctr., Durham, NC.
- 59** 4:20 Retinoic acid-generating enzymes in posterior neural transformation. G. Duester, I. Sirbu, N. Molotkova, A. Molotkov. Burnham Institute, La Jolla, CA.
- 60** 4:35 Soma-germ line competition for lipid phosphate uptake regulates germ cell migration and survival. A.D. Renault, Y.A. Sigal, A.J. Morris, R. Lehmann. Skirball Institute, NYU Medical Ctr., New York, NY; Dept of Cell and Developmental Biology, Univ. of North Carolina, Chapel Hill, NC.
- 61** 4:50 *En1* and *Wnt7a* interact with *Dkk1* during mouse limb development. M. Adamska, B.T. MacDonald, Z.H. Sarmast, E.R. Oliver, M.H. Meisler. Dept. of Human Genetics, Univ. of Michigan.
- 62** 5:05 A Serpin regulates the extracellular protease cascade that generates dorsoventral polarity in the *Drosophila* embryo. D. Morisato, H. Carl. The Evergreen State College, Olympia, WA; Yale Univ. Sch. of Med., New Haven, CT.
- 63** 5:30 MAP kinase modulation of Smad activity during *Drosophila* wing development. L.A. Raftery, M. Li, S. Korochkina, V. Le. MGH/Harvard Medical School, Charlestown, MA.
- 5:45 Maternal regulators of TGF beta signaling in early *Xenopus* development. J. Heasman, Children's Hosp. Med. Ctr. Div. Dev. Biol., Cincinnati, OH

7-10 PM

Awards Reception and Banquet

MacEwan Hall

Best poster competition winners will be announced
Entertainment

POSTER SESSIONS ABSTRACTS

Education Poster Session

MacEwan Ballroom

Sunday, July 25, 3:30-4:15 PM

Numbers in *Italics* indicate Program Abstract numbers. "B" numbers indicate Poster Board numbers. All authors present posters at the Education Poster Session, as well as at Poster Session I (see below).

- 221** B158 Every little bit counts. I. Chow. Soc Devel Biol, Bethesda, MD.
- 222** B159 Development and execution of a laboratory-based developmental biology course at Knox College. M.R. Fleetwood, J.L. Larsen, J.M. Thorn. Knox College, Galesburg, IL.
- 223** B160 The pesticide malathion disrupts *Xenopus* and zebrafish development: An investigative undergraduate laboratory in developmental toxicology. B. Lom, D.C. Chemotti, L.W. Cook, S.N. Davis, I.R. Willoughby, C. Morales, C.J. Paradise. Davidson College, Davidson, NC.
- 224** B161 Identification of putative target genes in the zebrafish *mbl/axin1* mutant by microarray analysis. H. Wang, J. Kesinger, Y. Tang, B. Frank, M. Centola. Dept. of Zoology, Univ. of Oklahoma, Norman, OK; Oklahoma Medical Research Foundation Microarray Research Facility, Oklahoma City, OK.
- 225** B162 Using Human Adult Mesenchymal Stem Cells in an Undergraduate Teaching Laboratory: Experiences over Three Years. J.S. Doctor. Dept. of Biological Sciences, Duquesne Univ., Pittsburgh, PA.

Poster Session I

MacEwan Ballroom

Saturday, July 24, 9-11 PM

Sunday, July 25, 3:30-4:15 PM, 9-11 PM

Numbers in *Italics* indicate Program Abstract numbers. "B" numbers indicate Poster Board numbers.

Odd number board authors present posters on Saturday, July 24, 9-11 PM

Even number board authors present posters on Sunday, July 25, 9-11 PM

Intracellular Signaling Pathways

64 B1 Biochemical analysis of Suppressor of fused, a negative regulator of Hedgehog signaling. P.C. Barnfield, X. Zhang, C. Hui. Dept. of Molecular and Medical Genetics, Univ. of Toronto, Toronto, Canada; Program in Developmental Biology, Hospital for Sick Children, Toronto, Canada.

65 B2 Analysis of Costal2 in mammalian hedgehog signal transduction. S. Makino, H. Cheung, Y. Yoshikawa, C. Hui. Dept. of Developmental Biology, The Hospital for Sick Children, Toronto, Canada; Dept. of Dermatology, Yamaguchi Univ., Yamaguchi, Japan.

66 B3 A conserved network of protein interactions downstream of LRP proteins exists in mouse and Drosophila. B.J. Avery, S. Vroman, G.M. Rubin. Dept. of Biology, Westminster College, Salt Lake City, UT; HHMI, Dept. of MCB, U. of CA, Berkeley, CA.

67 B4 Cross-talk between the TGF β and Wnt signaling pathways in murine embryonic maxillary mesenchymal cells. D.R. Warner, R.M. Greene, H.K. Smith, M. Michele Pisano. Univ. of Louisville Birth Defects Ctr., Dept. of Molecular, Cellular, and Craniofacial Biology, University of Louisville, Louisville, KY.

68 B5 *Xenopus* Wnt11 and frizzled 7 regulate convergent extension movements through cAMP/PKA pathway. E. Park, J. Han. Univ. of Pohang, Korea.

Gene Regulation

69 B6 Functional analysis of a site-selected PHA-4 binding site in *C. elegans*. V.C. Rott, J. Hardy, J.M. Kalb. Canisius College, Buffalo, NY.

70 B7 Coordinated Degradation of Maternal Proteins During the Egg-to-Embryo Transition in *C. elegans*. J. Pellettieri, G. Seydoux. Johns Hopkins Univ. Sch. of Med., Baltimore, MD.

71 B8 Temporal spatial regulation and functional specificity of cuticular collagens in *C. elegans* male sensory ray morphogenesis. W. Hui, Y. Lam, R. Yu, K. Chow. Dept. of Biology, Hong Kong Univ. of Sci. and Tech., Clear Water Bay, Kowloon, Hong Kong.

72 B9 Identifying regulators of pharynx development in *C. elegans*. J. Gaudet, I. Raharjo. Univ. of Calgary, Calgary, AB.

73 B10 Timing and Patterning of Gene Expression in the *C. elegans* Intestine. J. Yan, T. Fukushige, J.D. McGhee. Dept. of Biochemistry and Molecular Biology, Univ. of Calgary, Calgary, Alberta, Canada; Laboratory of Molecular Biology, NIH, Bethesda, MD.

74 B11 Regulation of the *elt-2* GATA-factor gene in the *C. elegans* intestine. J. Berg, B. Goszczynski, J. McGhee. Genes and Development Research Group, Univ. of Calgary.

75 B12 The mechanisms behind functional redundancy of transcription factors in *Drosophila melanogaster*. H.A. Field, K.P. White. Yale Univ., New Haven, CT.

76 B13 Dynamics of the TFIID factor in the *Drosophila* development. M. Zurita, J. Aguilar, V. Valadez, E. Reynaud. Instituto de Biotecnología/UNAM, Cuernavaca Morelos; Instituto de Biotecnología/UNAM, Cuernavaca Morelos 62250; Instituto de Biotecnología/UNAM, Cuernavaca Morelos.

77 B14 Expression of Aminopeptidase N During Sea Urchin Development. E.P. Ingersoll, A.J. Martin. Penn State Abington, Abington, PA.

78 B15 A functional and *cis*-regulatory analysis of *SpGata-e*. P. Lee, E.H. Davidson. California Institute of Technology, Pasadena, CA.

79 B16 Fish N Chips: Using DNA Microarrays To Analyze Gene Expression Changes In Zebrafish Embryos Deficient In Histone Deacetylase -1 (HDAC-1). L.E. Coverdale, C.C. Martin. Dept. of Biology, Univ. of Ottawa, Ottawa, ON, CANADA.

80 B17 Histone Deacetylase 1 (HDAC-1) Essential For Craniofacial Cartilage And Pectoral Fin Development In Zebrafish, *Danio Rerio*. R. Pillai, L.E. Coverdale, G. Dubey, C.C. Martin. Univ. of Ottawa, Ottawa, ON K1N 6N5 CANADA.

81 B18 Characterization of the pufferfish *Otx2 cis*-regulators reveals evolutionarily conserved genetic mechanisms for the vertebrate head development. C. Kimura-Yoshida, I. Oda-Ishii, M. Kobayashi, S. Aizawa,

I. Matsuo. Head Organizer Project, Vertebrate Body Plan Group, RIKEN CDB, Kobe, Japan; Univ. of Tsukuba; RIKEN CDB, Japan.

82 B19 Regulation of the *Math5* gene: A transgenic analysis during mouse and frog retinal development. M.E. Jungerman, T.T. Le, D.C. Blackburn, D. Hutchenson, M.L. Vetter, N.L. Brown. Divisions of Developmental Biology and Ophthalmology, Childrens Hospital Research Foundation, Cincinnati, OH; Dept. of Organismic and Evolutionary Biology, Harvard Univ., Boston, MA; Dept. of Anatomy and Neurobiology, Univ. of Utah Sch. of Medicine, Salt

83 B20 Transgenic analysis of *Xenopus* MRF4 gene regulation. T.J. Hinterberger, T.C. Wright. Univ. of Alaska, Anchorage, AK.

84 B21 Identification of Candidate HOX Effectors. T.M. Williams, M.E. Williams, R. Kuick, D.E. Misek, K.T. McDonagh, S.M. Hanash, J.W. Innis. Univ. of Michigan, Ann Arbor MI.

85 B22 *Hoxa5* regional expression along the developing anteroposterior axis necessitates the cooperation of several DNA regulatory elements. S. Tabariès, L. Jeannotte. Centre de recherche de L'Hôtel-Dieu de Québec, Québec, Canada.

86 B23 Genetic interaction between the Polycomb Group gene *M33* and the ETP Group gene *Asx11* in mice. C.L. Fisher, K. Humphries, T. Higashinakagawa, H.W. Brock. Dept. of Zoology, Univ. of British Columbia, Vancouver, Canada; Terry Fox Laboratory, BC Cancer Research Centre, Vancouver, Canada; Dept. of Biology, Waseda Univ., Tokyo, Japan.

87 B24 Effect of DNA Methylation On 11 β -Hydroxysteroid Dehydrogenase Type 2 Gene. R. Alikhani-Koopaei, F. Fouladkou, F.J. Frey, B.M. Frey. Division of Nephrology and Hypertension, Inselspital, 3010 Berne, Switzerland.

88 B25 Developmentally regulated alternative splicing in heart involves antagonism between CELF and PTB/MBNL proteins. A.N. Ladd, T.A. Cooper. Dept. of Pathology, Baylor College of Med., Houston, TX.

89 B26 Rex-1, a zinc finger family transcription factor, plays an important role in visceral endoderm development. S.W. Chen, J. Xu, L.J. Gudas. Weill Medical College of Cornell University.

90 B27 Involvement of Sox4 in endocrine pancreatic cell differentiation. A. Mavropoulos, N. Devos, F. Biemar, E. Zecchin, F. Argenton, H. Edlund, B. Peers, J.A. Martial. Laboratoire de Biologie Moléculaire et de Génie Génétique, Université de Liège, Institut de Chimie, Batiment B6, 4000 Liège (Sart-Tilman), Belgium; Dipartimento di Biologia, Università di Padova, Via U. Bassi 58b, 35131 Padova, Italy; Umea Centre for Molecular Medicine, Umea

91 B28 Expressions of TGF-Betas and BMPs during development of mouse tongue. A. Yamane, J. Nagata. Tsurumi Univ., Yokohama, Japan.

92 B29 Roles of DET1 & DDB1 in Plant Development. D.F. Schroeder. Univ. of Manitoba, Winnipeg, MB.

93 B30 A discovery workspace for gene regulation motifs and modules. G. Robertson, M. Bilenky, M. Hassel, S. McKay, M. Sleumer, T. Fu, A. Siddiqui, S. Jones. Canadas Michael Smith Genome Sciences Centre, Vancouver, BC, Canada.

Cell Proliferation

94 B31 Cloning and characterisation of CDC25 homologues from the zebrafish, *danio rerio*. D.E. Dalle Nogare, M. Lane. Rice Univ., Houston, TX.

95 B32 Identification of MEOX2 binding proteins and direct transcriptional targets. M.T. Friesen, J. Lin, K. Rawszer, J.T. Wigle. Univ. of Manitoba and Division of Stroke and Vascular Disease, St. Boniface Research Centre, Winnipeg, Canada.

96 B33 Human mesenchymal stem cells exhibit diminished proliferation capacity, and increased cell cycle length with increased in vitro passage. R.A. Meyer. Dept. Biomedical Sciences, Creighton Univ., Omaha, NE.

Germ Cells and Gametogenesis

97 B34 Using Roundworms to Understand Development: a *glh-4* mutant was caught. C.W. Yee, A.M. Orsborn, K.L. Bennett. Univ. of Missouri, Columbia, MO.

- 98** B35 Exclusion of germ plasm components from somatic lineages by localized protein degradation. C. DeRenzo, G. Seydoux. Johns Hopkins Univ. Sch. of Med., Baltimore, MD.
- 99** B36 Cloning And Characterization Of Vasa In Penaeoidean Shrimp. P.L. Hertzler, W. Zielinska, A.A. Lawrence, R.R. Spurbeck. Central Michigan Univ., Mt. Pleasant, MI.
- 100** B37 MATER, Encoded by a Maternal Effect Gene, Associates with Microtubules in Oocytes but not Early Embryos. M. Ohsugi, J. Dean. NIDDK, NIH, Bethesda, MD.
- 101** B38 Maternal-effect screens identify mutants that reduce germ cell number. L.T. Pusateri, A. Arkov, R. Lehmann. Skirball Institute, New York Univ. Sch. of Med., New York, NY.
- 102** B39 Expression screening for pathways that affect germ cell differentiation in the *Drosophila testis*. G.R. Hime, S.M. Bunt, F. Chan, N.A. Siddall. Univ. of Melbourne, VIC 3010, Australia.
- 103** B40 Development of multinucleate germ cells in the fetal testis coincides with loss of Sertoli-germ cell contact. E. Kleymenova, C. Swanson, E. Tewksbury, K. Gaido. CIIT CHR, RTP, NC.

Fertilization

- 104** B41 Sperm Chromatin Decondensation and *Wolbachia*-induced Cytoplasmic Incompatibility in *Drosophila simulans*. H.L. Harris, H.R. Braig. Univ. of Alberta, Edmonton, AB, Canada; Univ. of Wales, Bangor, Gwynedd, U.K.
- 105** B42 Control of endosperm development by Polycomb-group proteins. R. Yadegari, D. Wang, K.L. Newcomb, M.I. Skaggs. Dept. of Plant Sciences, Univ. of Arizona, Tucson, AZ.

Early Embryo Patterning

- 106** B43 Putative ECM-dependent PDGF signaling pathway in early sea urchin development. K. Bergeron, C.T. Dumitrescu, B.P. Brandhorst. Dept. of Molecular Biology and Biochemistry, Simon Fraser Univ., BC, Canada.
- 107** B44 The role of Snail gene in mesoderm specification in early development of sea urchin embryos. S. Wu, D.R. McClay. DCMB, Dept. of Biology, Duke Univ., Durham NC.
- 108** B45 Roles of Dishevelled in patterning sea urchin endomesoderm. C.A. Byrum, R.H. Xu, J.M. Bince, A.H. Wikramanayake. Univ. of Hawaii at Manoa, Honolulu, HI.
- 109** B46 Structure/function studies of the polarity regulator PAR-1 in *C. elegans*. A.A. Cuenca, G. Seydoux. Johns Hopkins Univ. Sch. of Med., Baltimore, MD.
- 110** B47 Analysis of the RING finger protein PAR-2 implicates the ubiquitination machinery in polarity maintenance in the *C. elegans* zygote. Y. Hao, T. Frazier, L. Boyd, G. Seydoux. Johns Hopkins Univ. Sch. of Med., Baltimore, MD; Univ. of Alabama-Huntsville, Huntsville, AL.
- 111** B48 *C. elegans* MEL-26 inhibits post-meiotic microtubule-severing activity of MEI-1. J.F. Johnson, P.E. Mains. Dept. of Biochemistry and Molecular Biology, Univ. of Calgary.
- 112** B49 Determining the role of Toll-7 in the embryonic development of *Drosophila melanogaster* through RNAi. C.D. Kleve, E.D. Eldon. California State Univ. Long Beach, Long Beach, CA.
- 113** B50 Reiterative requirement of *Sfrp1* during medaka eye development. J. Lopez-Rios, P. Esteve, P. Bovolenta. Instituto Cajal, CSIC. Av. Doctor Arce 37. 28002 Madrid, Spain.
- 114** B51 Neural patterning in zebrafish: upstream of the midbrain-hindbrain boundary organizer. M. Rhinn, K. Lun, M. Werner, M. Brand. Max-Planck-Institute of Molecular Cell Biology and Genetics and TU Dresden, Dresden, Germany.
- 115** B52 Characterization of *curly up* in Left-Right Patterning in the Zebrafish (*Danio Rerio*). J. Schottenfeld, R.D. Burdine. Princeton Univ., Princeton, NJ.
- 116** B53 Characterization of *locke*: understanding the link between kidney cysts and left-right patterning defects. J. Sullivan-Brown, R.D. Burdine. Princeton Univ., NJ.
- 117** B54 Cloning and characterization of Zebrafish ext1 homologues. A.F. Siekmann, M. Brand. Max-Planck-Institute for Molecular Cell Biology and Genetics and TU Dresden, Dresden, Germany.
- 118** B55 Zebrafish *pou5f/pou2*, homolog of mammalian *Oct4*, functions in the endoderm specification cascade. K. Lunde, H. Belting, W. Driever. Univ. of Freiburg, Freiburg, Germany.
- 119** B56 Maternal SOXs and endodermal patterning in *Xenopus* and Zebrafish. M.W. Klymkowsky, C. Zhang, S.R. Fawcett, T. Basta, A. Brown, K.B. Artigener. MCDB, UC Boulder; UCHSC, Denver.

- 120** B57 Neural tissue development in *Xenopus* requires early BMP/Smad1-independent FGF signaling, supporting a unified view of neural induction in chordates. E. Delaune, P. Lemaire, L. Kodjabachian. IBDM/LGPD, CNRS, Marseille, France.
- 121** B58 Biglycan is a novel BMP antagonist involved in the Chordin pathway. J. Larrain, R. Muñoz, F. Aroca, M. Labarca, E. Brandan, M. Moreno. Dept. of Cell and Molecular Biology; Ctr. for Cell Regulation and Pathology; Millennium in Developmental Biology; P. Universidad Católica de Chile.
- 122** B59 Early activation of *BMP4* expression by the *caudal* gene, *Xcad2*. A. Fainsod, N. Koutsi-Urshanski, S. Zins. Faculty of Med., Hebrew Univ., Jerusalem, Israel.
- 123** B60 A Double Negative: FoxD3 Regulation of the Nodal Pathway and Mesoderm Formation in *Xenopus*. A.B. Steiner, S. Yaklichkin, M.J. Engleka, J.L. Lefebvre, J.W. Walters, E.J. Craig, P.A. Labosky, D.S. Kessler. Dept. of Cell and Developmental Biology, Univ. of Pennsylvania, Philadelphia, PA.
- 124** B61 Evidence for long-range movement by diffusion of TGFβs during early embryogenesis in *Xenopus laevis*. P.H. Williams, J.C. Smith. Wellcome Trust/Cancer Research UK; Gurdon Institute, Univ. of Cambridge, UK; Wellcome Trust Sanger Institute, UK.
- 125** B62 The nature of the Nieuwkoop signal in early *Xenopus laevis*. A. Vonica, B.M. Gumbiner, A.H. Brivanlou. Rockefeller Univ., New York, NY; Univ. of Virginia, Charlottesville, VA; Rockefeller Univ., New York, NY.
- 126** B63 Cell Movement Patterns during Primitive Streak Initiation and Extension in the Chick Resemble Patterns in Viscous Flow. W. Zeng, J.A. Glazier, C.J. Weijer. Indiana University--Bloomington, Bloomington, IN; Univ. of Dundee, Dundee, UK.
- 127** B64 Notch signalling is involved in the isnode and midbrain roof plate formation. P. Alexandre, M. Wassef. Regionalisation nerveuse, CNRS UMR8549 Ecole Normale Supérieure, 46 Rue d'Ulm, Paris, France.
- 128** B65 Wnt Responsive Genes in Avian Neural Crest Induction. L. Taneyhill Ziemer, M. Bronner-Fraser. Caltech, Pasadena, CA.
- 129** B66 Wnt-5b may antagonize canonical Wnt signaling during chick embryo somite patterning. M. Meyerzon, L.W. Burrus. SFSU, San Francisco, CA.
- 130** B67 Early myotome formation in the central dermomyotome shows progressive medio-lateral development along cranial and caudal lips and in ectopically formed lips in chicken embryos. H. Nguyen, W.F. Denetclaw Jr. San Francisco State Univ., San Francisco, CA.
- 131** B68 Role of FGF4 in antero-posterior patterning of the endoderm. A. Grapin-Botton, J. Dessimoz, J.M. Wells. Division of Developmental Biology, Cincinnati Childrens Research Foundation, Cincinnati, OH; ISREC, Chemin des Boveresses 155, Case Postale, CH-1066 Epalinges s/Lausanne, CH.
- 132** B69 Anterior-posterior limb position is dependent on the relative timing of key embryonic events. T.C. Prestwich, T.D. Stephens, M.R. Stark. Brigham Young Univ., Provo, UT; Idaho St. Univ., Pocatello, ID.
- 133** B70 Early specification of haematopoietic and angiogenic lineages in Chick embryo: function of FGF and TGF-beta pathways. G. Sheng, C. Stern. Dept. of Anatomy and Developmental Biology, Univ. College London, Gower Street, London, United Kingdom.
- 134** B71 Human embryonic vascular development and potential of embryonic stem cells to induce neovasclogenesis. S. Gerecht-Nir, S. Osenberg, O. Nevo, A. Ziskind, R. Coleman, J. Itskovitz-Eldor. Technion Israel Institute of Technology, Haifa, Israel; Dept. of Obstetrics and Gynecology, Rambam Medical Center, Haifa, Israel.
- 135** B72 The Role of BMP Antagonism by the Organizer in Mammalian Neural Induction. Y. Yang, J. Klingensmith. Dept. of Cell Biology, Duke Univ. Medical Ctr., Durham, NC.
- 136** B73 BMP signaling is essential for mesoderm induction in the extraembryonic tissue and regulates mesoderm patterning in the epiblast. S. Miura, S. Davis, J. Klingensmith, Y. Mishina. LRDT, NIEHS/NIH, NC; Duke Univ., NC.
- 137** B74 Nodal antagonists regulate migration of the visceral endoderm along the future anteroposterior axis of the mouse embryo. M. Yamamoto, Y. Saijoh, A. Perea-Gomez, W. Shawlot, R.R. Behringer, S. Ang, H. Hamada, C. Meno. Osaka Univ., Suita, Japan and CREST(JST); IGBMC/CNRS/INSERM, Université Louis Pasteur, Strasbourg, France; Univ. of Texas, Houston, TX.
- 138** B75 Early Mouse Blastomeres Have Distinguishable Fates. K. Piotrowska, M. Zernicka-Goetz. Wellcome Trust/CR UK Gurdon Institute and Dept. of Genetics, Univ. of Cambridge, Cambridge, UK.

- 139** B76 The role of mouse cerberus-like and cripto in early mouse development. A.C. Borges, G. Liguori, G. Persico, J.A. Belo. Gulbenkian Institute for Science, Oeiras, Portugal; F.E.R.N., Universidade do Algarve, Portugal; Institute of Genetic and Biophysics, Adriano Buzzati-Traverso, CNR, Naples, Italy.
- 140** B77 Disabled-2 facilitates transport of maternal nutrients across the visceral endoderm. M.E. Duff, S.M. Morris, J.A. Cooper. Fred Hutchinson Cancer Research Ctr., Seattle, Washington.
- 141** B78 Post-implantation embryology of tetraploid and 2n:4n chimeric mice and rats. G.S. Eakin, R.R. Behringer. Baylor College of Med. Program in Developmental Biology, Houston; Univ. Texas M.D. Anderson Cancer Center, Houston.

Cell Fate Specification

- 142** B79 *Zac1* function in cell fate specification in the retina. L. Ma, J. Hocking, A. Varrault, N. Klenin, C. Stange, S. McFarlane, L. Journot, C. Schuurmans. Genes and Development Research Group, Univ. of Calgary, Calgary, AB, Canada; Génomique Fonctionnelle -UPR 2580 CNRS, CCIPE, Montpellier, France.
- 143** B80 Molecular dissection of *Xotx* action in the developing *Xenopus* retina. R. Vignali, M. Onorati, F. Cremisi, Y. Liu, R. He, G. Barsacchi. Università di Pisa, Dipartimento di Fisiologia e Biochimica, Laboratori di Biologia Cellulare e dello Sviluppo, Via G. Carducci 13, 56010 Ghezzano (Pisa), Italy; Scuola Normale Superiore, Piazza dei Cavalieri, Pisa, Italy; Chinese Academy of Sciences, Beijing, China.
- 144** B81 VEGF-Flk1 signaling regulates retinal progenitor proliferation and ganglion cell differentiation in the avascular chicken retina. T. Hashimoto, X. Zhang, Y. Chen, X. Yang. Jules Stein Eye Institute, Dept. of Ophthalmology, Molecular Biology Institute, Univ. of California, David Geffen Sch. of Med., Los Angeles, CA; Institute for Cancer Genetics, Columbia Univ., College of Physicians and Surgeons, New York, NY.
- 145** B82 Evidence of *ath5* leading to *neuroD* expression and photoreceptor genesis. S. Wang, W. Ma. Univ. of Alabama at Birmingham.
- 146** B83 *Dlx1* and *Dlx2* Homeobox Genes Regulate Neural Cell Fate Specification in Developing Mouse Retina. K. Shibasaki, L. Gan. Ctr. for Aging and Developmental Biology, Univ. of Rochester Sch. of Med., Rochester, NY.
- 147** B84 *Bhlhb5* involves in one subgroup of amacrine interneuron development in the mouse retina. L. Feng, L. Gan. Ctr. for Aging and Developmental Biology, Univ. of Rochester Medical Ctr., Rochester, NY.
- 148** B85 Roles for SIP1 (Smad-interacting protein 1) in lens development. A. Yoshimoto, Y. Higashi, H. Kondoh. Graduate Sch. of Frontier Biosciences, Osaka Univ., Osaka, Japan.
- 149** B86 Segregation of lens and olfactory precursors from a common territory: cell sorting and reciprocity of *Dlx5* and *Pax6* expression. A. Streit, S. Bhattacharyya, A.P. Bailey, M. Bronner-Fraser. Dept. Craniofacial Development, King's College London, London, UK; Division of Biology, Caltech, Pasadena CA.
- 150** B87 Withdrawn
- 151** B88 The Roles of *Pax3* and *FGFR4* in Trigeminal Placode Specification and Delamination. J.R. Bradshaw, S.B. Reynolds, M.R. Stark. Brigham Young Univ., Provo, UT.
- 152** B89 Analysis of the Role of *Sfrp-3* in Chick Neural Crest Specification. L.D. Acosta, L.M. Galli, T. Cheng, L.W. Burrus. San Francisco State Univ., Dept. of Biology, San Francisco, CA.
- 153** B90 Functional analysis of neuropilin-2 and a cohort of genes expressed in premigratory neural crest precursors. L.S. Gammill, M.S. Adams, C. Gonzalez, M. Bronner-Fraser. California Institute of Technology, Pasadena, CA.
- 154** B91 Graded Potential of Neural Crest to form Cornea, Sensory Neurons and Cartilage along the Rostrocaudal Axis. P.Y. Lwigale, G.W. Conrad, M. Bronner-Fraser. California Institute of Technology; Kansas State University.
- 155** B92 Brain-Derived Neurotrophic Factor Promotes Neurite Growth and Survival of Antennal Lobe Neurons from the Silk Moth, *Bombyx mori* in vitro. B.H. Lee, J.H. Kim, D.K. Sung, C.W. Park. Sch. of Life Sciences and Biotechnology, Korea Univ. of Korea, Seoul 136-701, Korea.
- 156** B93 *sns-10*, the *C. elegans* ortholog of *aristaless* /ARX, regulates sensory and motor neuron development. T.J. Melkman, P. Sengupta. Brandeis Univ., Waltham MA.

- 157** B94 BMP differentially regulates distinct subsets of Tlx-3 positive hindbrain sensory neurons. C. Logan, G. Ma, M. Ballermann, A. Hornbruch. Genes and Development Research Group, Univ. of Calgary, Calgary, AB, Canada.
- 158** B95 Control of gene expression by chondroitin sulfate in the presumptive head region of chick embryos. S.K. Sidhu, D.R. Canning. Murray State Univ., Murray, KY.
- 159** B96 Formation of neural plate involves Wnt pathway mediated by Frizzled7-Tbx2. V.P. Korzh, S. Fong, C. Teh, A.V. Emelyanov. Institute of Molecular and Cell Biology, Singapore.
- 160** B97 Conditional inactivation of RALDH2 reveals requirement of retinoids and HOXC8 in the specification of a subset of LIM1 expressing brachial motoneurons. I. Le Roux, J. Vermot, H. Le Mouellic, H. Meziane, P. Mc Caffery, P. Brulet, P. Chambon, P. Dolle. IGBMC, Parc d'innovation, BP 10142, 67404 Illkirch Cedex, France; Institut Pasteur, Paris, France; Eunice Kennedy Shriver Center, Waltham, MA.
- 161** B98 A screen for novel genes downstream of Neurogenin 2 in the developing neocortex. P.A. Mattar, O. Britz, C. Johannes, M. Nieto, L. Ma, N. Klenin, F. Guillemot, C.J. Schuurmans. Dept. of Biochemistry and Molecular Biology, Univ. of Calgary, Calgary, AB, Canada; Division of Molecular Biology, National Institute for Medical Research, London, UK; Beth Israel Deaconess Medical Center, Howard Hughes Medical Institute, Harvard Medical
- 162** B99 Brg1 is required for the differentiation of specific lineages in the CNS. L.S. Sherman, C. Adams, F. Banine, R. Xing, Y. Liu, D. Metzger, P. Chambon, S. Matsumoto. Oregon National Primate Research Ctr., Beaverton, OR; National Institute on Aging, Baltimore, MD; Université Louis Pasteur, 67404 Illkirch-Cedex, France; Oregon Health and Science Univ., Portland, OR.
- 163** B100 Genetic analysis of dopaminergic and noradrenergic neuron development in the zebrafish CNS. W. Driever, J. Holzschuh, K. Dürr, A. Ettl, S. Ryu. Univ. Freiburg, D-79104 Freiburg, Germany.
- 164** B101 Nkx6 genes differentially control oligodendrocyte generation in the spinal cord and hindbrain. J.M. Klos, A. Vallstedt, J. Ericson. Dept. of Cell and Molecular Biology, Karolinska Institute, S-171 77 Stockholm, Sweden.
- 165** B102 Dissecting the *C. elegans* mesendoderm gene network reveals a new role for Wnt signaling. M.F. Maduro, G. Broitman-Maduro, K. Lin, W. Hung. UC Riverside, Riverside, CA.
- 166** B103 Hyperactive Wnt signaling promotes transdetermination of lung endoderm progenitors into intestinal lineages. T. Okubo, B.L. Hogan. Dept. of Cell Biology, Duke Univ. Medical Center, Durham, NC.
- 167** B104 Sox17 regulates differentiation of progenitor cells in the airway epithelium in the lung. K. Park, J.M. Wells, J.A. Whitsett. Division of Pulmonary Biology,; Division of Developmental Biology, Cincinnati Childrens Hospital Medical Center, Univ. of Cincinnati College of Med., Cincinnati, OH.
- 168** B105 SerrateB-Notch mediate cell fate determination in zebrafish pronephric duct. M. MA, Y. Jiang. Laboratory of Developmental Signalling and Patterning, Institute of Molecular and Cell Biology, 1 Research Link, Singapore.
- 169** B106 FGF9 signaling and the nuclear expression of FGFR2 in Sertoli cell precursors during testis determination. Y. Kim, B. Capel. Duke Univ. Medical Ctr., Durham, NC.
- 170** B107 Cell lineage tracing in the mouse placenta using spongiotrophoblast-specific Cre transgenic mice. A.L. Fortier, H. Yamamoto, J.C. Cross. Univ. of Calgary, Calgary, Canada.
- 171** B108 On the development of embryonic haematopoietic and endothelial cells in *Xenopus*. A. Cia-Uitz, R. Patient. Institute of Genetics, Univ. of Nottingham, QMC, Nottingham, UK.
- 172** B109 *scylla* and *charybde*, cell death effectors in *Drosophila*. S.G. Kazuko, A. Scuderi, K. Simin, J.E. Metherall, A. Letsou. Univ. of Utah, Dept. of Human Genetics, Salt Lake City UT.

Patterning and Transcription Factors

- 173** B110 A cell biological analysis of the Ci signaling complex. B.E. Sisson, R.A. Holmgren. Dept. of Biochemistry, Molecular Biology and Cell Biology. Northwestern Univ., Evanston, IL.
- 174** B111 Regulation of *Cubitus interruptus* by a conserved domain. S.L. Ziegenhorn, J.A. Chapin, R.A. Holmgren. Dept. of Biochemistry, Molecular Biology, and Cell Biology, Northwestern Univ., Evanston, IL.
- 175** B112 cis-regulatory elements required for the transcriptional control of the proneural gene *amos*. E.E. Holohan, A.P. Jarman. Division of Biomedical Sciences, Univ. of Edinburgh, Edinburgh, UK.

- 176** B113 A novel binding site for the Iroquois family of transcription factors mediates transcriptional control during *Drosophila* development. A. Biloni, M. Mohns, H. McNeill. Cancer Research UK, London Research Institute, London, UK.
- 177** B114 *Egfr* regulates cell affinity in the *Drosophila* eye-antenna imaginal disc, affecting Wingless protein distribution and expression of specification factors for eye and antenna. J. Curtiss, M. Mlodzik. Mount Sinai Sch. of Med., New York, NY.
- 178** B115 The EGR-like transcription factor, *klumpfuss*, regulates apoptosis in the *Drosophila* retina. J.C. Rusconi. Univ. at Albany-SUNY, Albany, NY.
- 179** B116 The longitudinal veins of the *Drosophila* wing as organizers of crossvein development. A. Ralston, S.S. Blair. Univ. of Wisconsin, Madison, WI.
- 180** B117 Positional Specification in the *Drosophila* Segmentation Hierarchy. D.M. Holloway, A.V. Spirov. Univ. Brit. Columbia, Vancouver, Canada; SUNY, Stony Brook, USA.
- 181** B118 Caudal proteins are regulators during the initiation phase of Hox genes. R. Ben-Haroush Schyr, C.S. Shashikant, A. Fainsod. Faculty of Med., Hebrew Univ., Jerusalem 91120, Israel; College of Agricultural Sciences, The Pennsylvania State Univ., Univ. Park, PA.
- 182** B119 Protein and mRNA dynamics in the zebrafish somitogenesis oscillator. F. Giudicelli, G. Wright, J. Lewis. Cancer Research UK, London.
- 183** B120 Analysis of the role of Pax-7 during chick somite patterning. S.R. Knight, L.M. Galli, C.E. Krull, J.M. Venuti, L.W. Burrus. SF State Univ.; Univ. of Michigan; Columbia Univ.
- 184** B121 Conditional regulation of Pax6 protein function with a chemical inducer of dimerization. H. Bayle, K. Stankunas, Y. Lin, T.J. Wandless, G.R. Crabtree. HHMI and Depts of Pathology and Developmental Biology, Stanford Univ., Stanford, CA; Dept. of Molecular Pharmacology, Stanford Univ., Stanford, CA; Dept. of Chemistry, Univ. of Toledo, Toledo, OH.
- 185** B122 *Hoxb1* functions in both motoneurons and in tissues of the periphery to establish and maintain the proper neuronal circuitry. B.R. Arenkiel, P. Tvrdik, G.O. Gaufo, M.R. Capecchi. Dept of Human Genetics, Univ. of Utah School of Medicine; Howard Hughes Medical Institute.
- 186** B123 Roles of Six1 in Patterning of Otic and Nasal Primordia. K. Kawakami, K. Nakamura, H. Ozaki, S. Sato, K. Ikeda. Division of Biology, Ctr. for Molecular Med., Jichi Med. Sch., Japan.
- 187** B124 Importance of sonic hedgehog in the morphogenetic activity of the zona limitans intrathalamica. C. Vieira, S. Martinez. Neuroscience Institute, Univ. Miguel Hernandez, Alicante, Spain.
- 188** B125 Patterning the Striatum in the Mammalian Forebrain: Genetic Control by Retinoid Receptors. F. Liu, W. Liao, P. Chambon. Institute of Neuroscience, National Yang-Ming Univ., Taipei 112, Taiwan; IGBMC, Universite Louis Pasteur, France.
- 189** B126 Retinoic acid establishes posterior hindbrain identities through a combination of activation and indirect repression of rhombomere specific genes. R.E. Hernandez, H.A. Rikhof, C.B. Moens. HHMI & Div. of Basic Sciences, FHCRC, Seattle, WA.
- 190** B127 Hedgehog Patterning of the Anterior Neurocranium. J. Eberhart. Univ. of Oregon.
- 191** B128 Combinatorial gene function in the embryonic zebrafish hindbrain. E. Wiellette, H. Sive. Whitehead Institute for Biomedical Research, Cambridge, MA.
- 192** B129 Zebrafish T-box genes and floor plate formation. T.M. Han, X. Xu, J. Leigh, S.L. Amacher. Univ. of California, Berkeley, CA.
- 193** B130 Restricted expression of XVAX2 in adult eye and brain of *Xenopus laevis*. M. Liu, Y. Liu, Y. Liu, G. Lupo, G. Barsacchi, R. He. Institute of Biophysics, Chinese Academy of Sciences, Beijing 100101, China; Univ. of Cambridge, Cambridge, UK; Univ. of Pisa, Italy.
- 194** B131 A balance between the anti-apoptotic activity of *Slug* and the apoptotic activity of *msx1* is required for the proper development of *Xenopus* neural crest. C. Trmbulo, M.J. Aybar, S.S. Sánchez, R. Mayor. Dept. of Developmental Biology, INSIBIO (CONICET-Univ. of Tucumán), Argentina; MNDB-ICM, Faculty of Sciences, Univ. of Chile, Chile; Dept. of Anatomy and Developmental Biology, UCL, UK.
- 195** B132 *Tbx1* is required for proper neural crest migration and to stabilize spatial patterns during middle and inner ear development. F.P. Moraes, A.C. Nóvoa, L.A. Jerome-Majewska, V.E. Papaioannou, M.M. Mallo. Instituto Gulbenkian de Ciência, Oeiras, Portugal; Dept. of Genetics and Development, College of Physicians and Surgeons of Columbia Univ., New York, New York.

- 196** B133 Characterization of the chick Sulfatase-1 as a new marker of oligodendrocyte progenitors and putative modulator of Shh signaling in the embryonic spinal cord. C. Soula, C. Danesin, E. Agius, N. Escalas, X. Ai, C. Emerson, P. Cochard. Centre de Biologie du Developpement, Toulouse, FRANCE; Boston Biomedical Research Institute, Watertown, MA.
- 197** B134 Characterization of a transcriptional repressor complex in male sensory ray patterning of *C. elegans*. S. Choy, K. Chow. Dept. of Biology, Hong Kong Univ. of Sci. and Tech., Clear Water Bay, Kowloon, Hong Kong.
- 198** B135 Mutational analysis of *cis*-acting regulatory elements controlling transcription of *Dlx* genes. L. Poitras, G. Hatch, M. Ekker. Ottawa Hlth. Research Institute; Dept. of Cellular and Molecular Med., Univ. of Ottawa.
- 199** B136 Role of *Mab21l2* in vertebrate development. G. Lau, W. Tsang, Y. Lee, K. Chow. Hong Kong Univ. of Sci. & Tech., Hong Kong.
- 200** B137 qBrn-1, a novel POU III gene, expressed in developing quail embryo. L. Lan, Y. Liu, Y. Liu, W. Liu, W. Zhang, J. Xue, R. He, Z. Xue. Institute of Biophysics, Chinese Academy of Sciences, Beijing 100101, China.
- 201** B138 Domain requirements for Gli3-Hoxd protein interaction to reverse Gli3-repressor function and promote digit formation. M.F. D'Souza, Y. Chen, S. Mackem. HHMI-NIH Research Scholar; NCI, NIH, Bethesda, MD.
- 202** B139 Hand2 and Twist1 Interact Antagonistically in the Vertebrate Limb. E. Laufer, B. Firulli, D. Krawchuk, V. Centonze, D. Virshup, S. Conway, P. Cserjesi, A. Firulli. Columbia Univ., NY; Indiana Medical School; Univ. of Texas, San Antonio; Univ. of Utah; Louisiana St. Univ.
- 203** B140 Limb and mandible cultures both demonstrate that the Prx1 homeobox gene isoforms have antagonistic roles during chondrogenesis. J.M. Mitchell, R.E. Peterson, M.J. Kern. Medical Univ. of South Carolina, Charleston, SC.
- 204** B141 Effects of Ethanol on Craniofacial Development of Zebrafish Embryos. C. Kwok, S. Cheng. City Univ. of Hong Kong, Hong Kong.
- 205** B142 Transcription of Myogenic Regulatory Factors In The Non-contractile Electrogenic Cells Of the Electric Fish *S. macrurus*. J.A. Kim, H. Cuellar, G.A. Unguez. NMSU, Las Cruces, NM.
- 206** B143 Chick Nkx-2.5: BMP activation and maintenance of an evolutionarily conserved cardiac determinant. K. Lee, A.B. Lassar. Harvard Medical School, Boston, MA.
- 207** B144 The *Drosophila melanogaster* *Tbx20* genes *midline* and *H15* are required for heart development. R.J. Scavetta, C.M. Mickolczi-McCallum, P.C. Svendsen, K.H. Soanes, W.J. Brook. Univ. of Calgary, Calgary AB, Canada.
- 208** B145 Role of Myt1 for endocrine differentiation and function. G. Gu, Y. Xu. Vanderbilt Medical Ctr., Nashville, TN.
- 209** B146 Siamois and Twin are redundant genes required for Wnt-induced transcription and formation of the Spemann organizer. D.S. Kessler, S. Bae. Dept. of Cell and Developmental Biology, Univ. of Pennsylvania, Philadelphia, PA; Korea Cancer Ctr. Hospital, Seoul, Korea.
- 210** B147 Exploring The Oral Ectoderm Gene Regulatory Network Of The Sea Urchin Embryo. G. Amore, O. Otim, T. Minokawa, E.H. Davidson. Division of Biology - Caltech Pasadena- Ca USA.

Molecular Medicine and Development

- 211** B148 The role of ANK in regulating bone disease and arthritis in mice and humans. K.A. Gurley, C. Guenther, D.M. Kingsley. HHMI and Stanford University.
- 212** B149 Lack of respiratory neural network in sodium pump alpha2 subunit deficient mice. K. Ikeda, K. Kawakami. Jichi Med. Sch., Tochigi, Japan.
- 213** B150 A novel mouse model of hypogonadotrophic hypogonadism. A.J. Pask, H. Kanasaki, U.B. Kaiser, M.J. Justice, R.B. Behringer. Dept. of Zoology, Univ. of Melbourne, Victoria 3010, Australia; Dept. of Molecular Genetics, Univ. of Texas M. D. Anderson Cancer Center, Houston, TX; Division of Endocrinology, Harvard Medical Sch., Boston, MA; Dept. of Molecular and Human Genetics, Baylor College of Med., Houston, TX.

214 B151 Short neuropeptide F regulates food intake in *Drosophila*. K. Yu, K. Lee, Y. Han. Korea Research Institute of Bioscience and Biotechnology, Daejeon, Korea; Chung-Ang Univ., Seoul, Korea.

Functional Genomics

215 B152 The Adult Mouse Anatomical Dictionary: A Tool for Annotating and Integrating Data. T.F. Hayamizu, M. Mangan, J.P. Corradi, D.P. Hill, J.T. Eppig, M. Ringwald. Gene Expression Database, Mouse Genome Informatics, The Jackson Laboratory, Bar Harbor, ME.

216 B153 EMAGE - Edinburgh Mouse Atlas of Gene Expression. L. Richardson, J. Christiansen, S. Venkataramen, N. Burton, Y. Yang, P. Stevenson, R. Baldock, D. Davidson. MRC Human Genetics Unit, Edinburgh, UK.

217 B154 The Gene Expression Database for mouse development (GXD). D.P. Hill, T.F. Hayamizu, J.T. Eppig, M. Ringwald. The Jackson Laboratory, Bar Harbor, ME.

218 B155 Mouse ENU mutagenesis identifies new genes involved in blood and blood vessel development. M.J. Justice, B.T. Kile, K.E. Hentges, K. Hirschi, L. Lai, B. Liu, R.R. Behringer. Baylor College of Med., Houston, TX; The Univ. of Texas MD Anderson Cancer Center, Houston, TX.

219 B156 A genome-wide RNAi screen to identify genes involved in neuronal and glial development, function, and survival. K.J. Sepp, N. Perrimon. Harvard Medical School, Howard Hughes Medical Institute, Boston, MA.

220 B157 The genomic analysis of implantation serine protease 1 & 2 and the generation of knockout mouse models. L. Tang, C. O'Sullivan, S. Liu, K. Ito, K. Melton, H. Xu, D. Rancourt. Univ. of Calgary, Calgary, Canada.

Education

221 B158 Every little bit counts. I. Chow. Soc Devel Biol, Bethesda, MD.

222 B159 Development and execution of a laboratory-based developmental biology course at Knox College. M.R. Fleetwood, J.L. Larsen, J.M. Thorn. Knox College, Galesburg, IL.

223 B160 The pesticide malathion disrupts *Xenopus* and zebrafish development: An investigative undergraduate laboratory in developmental toxicology. B. Lom, D.C. Chemotti, L.W. Cook, S.N. Davis, I.R. Willoughby, C. Morales, C.J. Paradise. Davidson College, Davidson, NC.

224 B161 Identification of putative target genes in the zebrafish *mb1/axin1* mutant by microarray analysis. H. Wang, J. Kesinger, Y. Tang, B. Frank, M. Centola. Dept. of Zoology, Univ. of Oklahoma, Norman, OK; Oklahoma Medical Research Foundation Microarray Research Facility, Oklahoma City, OK.

225 B162 Using Human Adult Mesenchymal Stem Cells in an Undergraduate Teaching Laboratory: Experiences over Three Years. J.S. Doctor. Dept. of Biological Sciences, Duquesne Univ., Pittsburgh, PA.

Poster Session II

MacEwan Ballroom

Monday, July 26, 1-2:30 PM, 9-11PM

Tuesday, July 27, 1-3 PM

Numbers in ***Italics*** indicate Program Abstract numbers. "B" numbers indicate Poster Board numbers.

Odd number board authors present posters on Monday, July 26, 9-11 PM

Even number board authors present posters on Tuesday, July 27, 1-3 PM

Development and Evolution

226 B1 Evolution of mechanisms responsible for gastrulation in the maximum direct developing ascidian, *Molgula pacifica*. W.R. Bates. Okanagan Univ. College, Kelowna, BC.

227 B2 Pigmentation in the sensory cells of the ascidian larvae is essential for normal behavior. J.W. Tresser, D. Jiang, W.C. Smith. Univ. of California, Santa Barbara.

228 B3 Functional roles of innate immunity in ascidian metamorphosis. B.W. Roberts, E. Ma, S. Smith Wallace, E. Edsinger Gonzalez, B.J. Swalla. Univ. of Washington, Seattle, WA.

- 229** B4 Cis-regulatory elements driving muscle-specific expression of an Ascidian troponin I gene. P. Khare, C. Cleto, T.H. Meedel, K.E. Hastings. Montreal Neurological Institute (MNI), McGill Univ.; MNI, McGill Univ.; Biology Dept., Rhode Island College; MNI, McGill Univ.
- 230** B5 Hox gene cluster in *Ciona intestinalis*: its dispersed structure and residual colinear expression in development. T. Ikuta, N. Yoshida, N. Satoh, H. Saiga. Tokyo Metropolitan Univ., Tokyo, Japan; Kyoto Univ., Kyoto, Japan.
- 231** B6 Are porifera and archaeometazoa diploblasts? C.C. Coutinho, R.N. Fonseca, G.A. Maia, R. Borojevic. UFRJ, Dep. de Hist. e Emb, Inst. de Ciências Biomédicas, Brasil; UFRJ, Dep. de Bioquímica, Inst. de Química, Brasil.
- 232** B7 Why is the Homeodomain (HD) Evolutionarily Conserved? The HD Contains Multiple Overlapping Functional Domains. J.J. Roth, G.P. Wagner. Yale Univ., New Haven, CT; Univ. of Salzburg, 5020 Salzburg, Austria.
- 233** B8 Functional Dominance Among Hox Genes: The Genetic Requirements. M.E. Williams, J.W. Innis. Univ. of Michigan, Ann Arbor, MI.
- 234** B9 Evidences for evolutionary conservation of Hox11/Tlx family controlling myelopoiesis. R.N. Fonseca, R. Borojevic, C.C. Coutinho. UFRJ, Dep. de Bioquímica, Inst. de Química, Brasil; UFRJ, Dep. de Hist. e Emb, Inst. de Ciências Biomédicas, Brasil.
- 235** B10 Hox genes in a basal group of euarthropods: pycnogonida. A. Maxmen, M.Q. Martindale, G. Giribet. Harvard Univ., Cambridge, MA; Univ. of Hawaii, Honolulu, HI; Harvard Univ., Cambridge, MA.
- 236** B11 The role of *Ubx* in crustacean development. D.M. Liubicich, N.H. Patel. Univ. of California, Berkeley.
- 237** B12 The role of caudal, even-skipped and spalt genes during segment formation in the crustacean *Artemia franciscana*. T. Copf, M. Averof. Biology Department, Univ. of Crete, Iraklio Crete, Greece; Institute of Molecular Biology and Biotechnology (IMBB), Iraklio Crete, Greece.
- 238** B13 Developmental Expression of *otd*, *ems*, and *lab* in the head and CNS of *Parhyale hawaiensis*. W.E. Browne, N.H. Patel, M.Q. Martindale. Kewalo Marine Lab, Univ. of Hawaii; HHMI and Univ. of California, Berkeley.
- 239** B14 Microevolution of vulva development in American and European strains of *P. pacificus*. H. Zauner, H. Witte, R.J. Sommer. Max Planck Institut für Entwicklungsbiologie, 72076 Tübingen, Germany.
- 240** B15 *C. briggsae* Sex Determination Mutants. D.F. Kelleher, C. Carvalho, M.R. Layton, E.S. Haag, D.B. Pilgrim. Univ. of Maryland, College Park, MD; Univ. of Alberta, Edmonton, Canada.
- 241** B16 Screening for Deletions in *C. briggsae* Sex Determination Genes. R. Hill, B. Schlager, E.S. Haag. Dept. of Biology, Univ. of Maryland, College Park, MD.
- 242** B17 Distinct effects of virginity and caloric restriction on lifespan of female *Drosophila melanogaster*. T. Bross, B. Rogina, S. Helfand. Univ. of Connecticut Hlth. Ctr., Farmington, CT.
- 243** B18 Early blastomere determines caste fate in the polyembryonic wasp. V. Zhurov, T. Terzin, M. Grbic. Univ. of Western Ontario, Dept. of Biology, London, ON, Canada.
- 244** B19 Transposon-mediated Gene-trap: A Screen for Live Markers in the Zebrafish, *Danio rerio*. J.R. Morillo, S.L. Johnson, K. Kawakami, R. McMahan. Florida International Univ., Miami, FL; Washington Univ. in St. Louis, St. Louis, MO; Tokyo Univ., Tokyo, Japan; Univ. of Illinois, Champaign, IL, USA.
- 245** B20 Using a Differential Hybridization Approach to Study Evolution and Development in the Blind Cavefish. A.G. Strickler, W.R. Jeffery. Dept. of Biology, Univ. of Maryland, College Park, MD.
- 246** B21 Development and evolution of cavefish pigment cells. E.R. Hixon, W.R. Jeffery. Univ. of Maryland, College Park, MD.
- 247** B22 expression and genomic comparison of *Hoxa2a* and *Hoxa2b* genes in striped bass embryos. J. Scemama, P. Sethi, P. Le Pabic, E. Stellwag. Dept. of Biology, East Carolina Univ., Greenville, NC.
- 248** B23 A genetic basis for vertebral column truncation in frogs and toads (Anura). G.R. Handrigan, R.J. Wassersug. Dept. of Biology, Dalhousie Univ., Halifax, NS, Canada.
- 249** B24 The role of paracrine factors in the production of the turtle carapace: A hypothesis. J. Cebra-Thomas, F. Tan, C. Kim, S. Gilbert. Swarthmore College, PA.
- 250** B25 Msx2 Controls Hair Shaft Differentiation. J. Cai, D. Gonzalez, L. Ma. Tulane Univ., New Orleans, LA.

- 251** B26 The fate of primary aneuploid cells during mouse embryo development. D.A. Lightfoot, C. Höög. Dept. of Cell and Molecular Biology, Karolinska Institute, Stockholm, Sweden.
- 252** B27 Anterior-Posterior Patterning By RA And The Evolutionary Origin Of Cardiac Chambers. J. Xavier Neto, M.S. Simões Costa, C.I. Yan, B. Davidson. Lab. Gen. Mol. Cardiol. Heart Institute, Univ. of Sao Paulo, Brazil; Lab. Gen. Mol. Cardiol. Heart Institute, Univ. of Sao Paulo-SP 05403-900 Brazil; Dept. of Cell Biology & Development, Univ. of Sao Paulo-SP, Brazil; Dept. of Molecular and Cell Biology, Division of Genetics and Development, Univ.
- 253** B28 Cartilage development: insights from studies on invertebrate taxa. A.G. Cole, B.K. Hall. Dalhousie Univ., Halifax NS, Canada.
- 254** B29 Problems with characterizing the protostome-deuterostome ancestor. P.A. Nelson, M.R. Ross. Discovery Institute, Seattle, WA; Univ. of Rhode Island, Kingston, RI.

Cell-Cell Signaling

- 255** B30 The γ -ear of adaptor protein 1: involvement in endocytosis. E.A. Jezuit, J.M. Thorn, B.K. Kay. Knox College, Galesburg, IL; Argonne National Laboratory, Argonne, IL.
- 256** B31 Roles of FGF-receptor signaling in modulation of ephrinB/EphB-receptor system. A.A. Poliakov, A. Pasini, D.G. Wilkinson. National Institute for Medical Research, London NW7 1AA, United Kingdom.
- 257** B32 An FGFR1 signaling mutant reveals a requirement for FRS2-mediated signaling in development of limbs and posterior structures. R.V. Hoch, P. Soriano. FHCRC/UW, Seattle, WA.
- 258** B33 Hedgehog in epithelial to mesenchymal transitions in the sea urchin *Lytechinus variegatus*. K.D. Walton, P.L. Hertzler, H.C. Kim, D.R. McClay. Duke Univ., Development, Cell and Molecular Biology Group, Durham, NC; Central Michigan Univ., Dept. of Biology, Mt. Pleasant, MI.
- 259** B34 Developmental Mutation Draemong In *Ciona savignyi* Reveals Link Between Atrial Siphon Formation And Gill Slit Induction. N.K. Silva, M.J. Kourakis, Y. Nakatani, W.C. Smith. Univ. of California - Santa Barbara, Santa Barbara, CA; Tokyo Institute of Technology, Yokohama, Kanagawa, Japan.
- 260** B35 *crm-1* is a facilitator of the *bmp* pathway in worm to control the body morphology. Y. Wong, K. Chow. Dept. of Biology, Hong Kong Univ. of Sci. and Tech., Clear Water Bay, Kowloon, Hong Kong.
- 261** B36 Using *Drosophila* system to search for human genes involved in EGFR signaling. L. Pai, I. Lee. Chang-Gung Univ. Tao-Yuan, Taiwan.
- 262** B37 mibL is a second E3 ubiquitin ligase of mib family and promotes DeltaC internalization. Q. LI, C. Zhang, Y. Jiang. Institute of Molecular and Cell Biology, 1 Research Link, Singapore.
- 263** B38 Retinoic acid as a morphogen during early zebrafish development. R.J. White, T.F. Schilling. Univ. of California, Irvine, CA.
- 264** B39 Over-Expression Of Zebrafish Frizzled 7a And 7b Alters Cell Movements Associated With Gastrulation. M.N. Knowlton, G.M. Kelly. Dept. of Biology, Univ. of Western Ontario.
- 265** B40 AP-2-Dependent Ectodermal Signals Regulate Skeletogenesis of Zebrafish Neural Crest. T.F. Schilling, Y. Javidan, R.D. Knight. Univ. of California, Irvine.
- 266** B41 Genetic analysis of photoreceptor cell development in the zebrafish retina. J.M. Fadool, A. Davis, M. Merritt. Florida State Univ., Tallahassee.
- 267** B42 ErbB signals in early *Xenopus* development. S. Nie, C. Chang. Univ. of Alabama at Birmingham, Birmingham, AL.
- 268** B43 The role of platelet-derived growth factor signaling during gastrulation in *Xenopus laevis*. M. Van Stry, K. Symes. Boston Univ., Boston, MA.
- 269** B44 Glypican4 modulates FGF signaling and regulates dorso-ventral forebrain patterning in vertebrate embryos. A. Galli, A. Roure, R. Zeller, R. Dono. Univ. of Basel Medical School, Basel 4056, Switzerland; IBDM, Marseille, France.
- 270** B45 Ectoderm Microdomains (Lipid Rafts) Regulate Myotome Formation in Somites of the Chicken Embryo. W.F. Denetclaw Jr., B.R. Kuo, J. Samos, H. Nguyen, S.S. Gottlieb. Biology Department, San Francisco State Univ., San Francisco, CA.

- 271** B46 A proliferative role for Frizzled-10 in the dorsal neural tube. R.N. Munji, L.M. Galli, R.O. Suriben, M.R. Stark, L.W. Burrus. Dept. of Biology, San Francisco State Univ., San Francisco, CA; Dept. of Physiology and Developmental Biology, Brigham Young Univ., Provo, UT.
- 272** B47 Analysis of the role of Sfrps in modulating Wnt-3a activity. T. Barnes, L.M. Galli, A. Anglade, P. Francis-West, K. Willert, R. Nusse, P. Bovolenta, L.W. Burrus. Dept. of Biology, SFSU, San Francisco, CA; Kings College, UK; Stanford University; Instituto Cajal, Madrid.
- 273** B48 Frizzled-1 and Frizzled-7 mediate Wnt signaling in midbrain/hindbrain boundary formation. R.T. Lassiter, J.L. Jensen, R. Goode, M.R. Stark. Brigham Young Univ., Provo, UT.
- 274** B49 Expression of bone morphogenetic proteins and their receptors in developing nociceptive neurons. N.L. Link, R.C. Murray. Hendrix College, Conway, AR.
- 275** B50 A transgenic approach for determining the role of bone morphogenetic proteins in the development of olfactory receptor neurons. A. Wineland, I.L. Blitz, R.C. Murray, A.L. Calof. Hendrix College, Conway, AR; Univ. of California, Irvine, CA.
- 276** B51 Immunodetection of EPF/Cpn 10 in murine outgrowths. J.M. McCammon, Y.P. Cruz. Oberlin College, OH.

Morphogenesis

- 277** B52 Plant Development at Growing Tips and Apical Meristems: Putting Experiment and Macroscopic-Scale Theory Together. L.G. Harrison, D.M. Holloway, R.J. Adams, P. von Aderkas. Univ. of British Columbia, Vancouver, B.C., Canada; Univ. of Victoria, Victoria, B.C., Canada.
- 278** B53 Two components of a secreted cell-number counting factor bind to cells and activate distinct signal transduction pathways to regulate tissue size in *Dictyostelium*. R.H. Gomer, D.A. Brock, K. Ehrenman, R. Ammann, Y. Tang. HHMI/ Rice Univ., Houston, TX.
- 279** B54 Bacterial peptidoglycan and lipopolysaccharide work in synergy to induce tissue morphogenesis in the squid-vibrio association. T.A. Koropatnick, J.T. Engle, M.A. Apicella, E.V. Stabb, W.E. Goldman, M.J. McFall-Ngai. Univ. of Hawaii, Honolulu, HI; Washington Univ. St. Louis, MO; Univ. of Iowa, Iowa City, IA; Univ. of Georgia, Athens, GA.
- 280** B55 The small GTPase RhoA is essential for gastrulation in the sea urchin embryo. W.S. Beane, J.M. Gross, D.R. McClay. Duke Univ., Durham, NC; Harvard Univ., Cambridge, MA.
- 281** B56 Ascidian pk is an essential gene for notochord morphogenesis. D. Jiang, E.M. Munro, W.C. Smith. MCDB, UCSB, Santa Barbara, CA; Ctr. for Cell Dynamics, FHL, Friday Harbor, WA.
- 282** B57 *lin-35/Rb* and *xnp-1/ATR-X* function redundantly to control somatic gonad development in *C. elegans*. A.M. Bender, D.S. Fay. Univ. of Wyoming, Laramie, WY.
- 283** B58 A novel matrix molecule MAB-7 is required in *C. elegans* sensory ray morphogenesis. S. Tsang, K. Chow. Dept. of Biology, Hong Kong Univ. of Sci. & Tech., Clear Water Bay, Kowloon, Hong Kong.
- 284** B59 Presence and function of allatotropin in developmental stages of *Heliothis virescens* and *Apis mellifera*. A. Rachinsky, J.M. Glasscock. Univ. of Minnesota Duluth, Duluth, MN.
- 285** B60 Boundary between two cell types coordinates tube formation during dorsal appendage formation. E.J. Ward, C.A. Berg. Univ. Washington, Seattle, WA.
- 286** B61 Ontogeny of MMP expression and activity during zebrafish development. B.D. Crawford, M.D. Po, D.B. Pilgrim. Univ. of Alberta, Edmonton, Canada.
- 287** B62 characterization of two new hedgehog genes in zebrafish. F. Avaron, L. Hoffman, M. Akimenko. Ottawa Hlth. Research Institute; Robarts Research Institute, London ON; Univ. of Ottawa, Cellular and Molecular Med. Dept.
- 288** B63 FGF8 deficiency results in left-right craniofacial asymmetry in zebrafish. R. Albertson, P.C. Yelick. The Forsyth Institute, Boston, MA.
- 289** B64 Zebrafish *touchtone* and *endzone* are selectively required for neural crest-derived chromatophore development. B.L. Arduini, P.D. Henion. Ohio State Univ., Columbus, OH.
- 290** B65 The role for non-canonical WNT/PCP signaling in zebrafish neural tube morphogenesis. B. Ciruna, A. Schier. Skirball Institute, NYU Sch. of Med., New York, NY.

- 291** B66 Development of smooth muscle in zebrafish. S. Georgijevic, E.M. Rollins, A.C. Tang, O. Starovic-Subota, S. Childs. Biochemistry and Molecular Biology, Univ. of Calgary, Calgary AB.
- 292** B67 Cellular mechanism for coordinated oscillation of the segmentation clock. K. Horikawa, S. Kondo, H. Takeda. Univ. of Tokyo, Japan; Nagoya Univ., Japan.
- 293** B68 Characterization of *cordon-bleu* expression in the organizer and axial midline. L.M. Yudt, E.A. Carroll, J. Klingensmith. Dept. of Cell Biology, Duke Univ. Medical Ctr., Durham, NC.
- 294** B69 The Role of Transforming Growth Factor- β in the Development of the Axial Skeleton. M. Baffi, R. Serra. Univ. of Alabama at Birmingham.
- 295** B70 Coordination of Chondrocyte Differentiation and Joint Formation by $\alpha 5 \beta 1$ Integrin in the Developing Appendicular Skeleton. G. David, R. Carlos, M. Katoh, C. Jesús. Departamento de Biología Celular y Fisiología, Instituto de Investigaciones Biomédicas, Universidad Nacional Autónoma de México, Mexico City, Mexico; Departamento de Inmunología, Instituto de Investigaciones Biomédicas, Universidad
- 296** B71 Endothelin-A receptor-dependent and independent pathways establish a mandibular identity during facial morphogenesis. L. Ruest, X. Xiang, K. Lim, G. Levi, D.E. Clouthier. Univ. of Louisville, Louisville, KY; Univ. of Michigan, Ann Arbor, MI; CNRS/MNHN Paris, France.
- 297** B72 Three-dimensional reconstruction of maxillo-facial architecture and tissue elements of mouse embryos. Y. Shimazu, Y. Soeno, Y. Taya, K. Sato, T. Aoba. Nippon Dental Univ., Tokyo, Japan.
- 298** B73 The Role of Proliferation and Cell Shape Changes During Ciliary Body Morphogenesis in the Mouse. H.R. Napier, S.H. Kidson. Univ. of Cape Town, South Africa.
- 299** B74 BMP7 inhibits epithelial bud formation in the mouse prostate gland. I.B. Grishina, S. Kim, H.P. Makarenkova, P.D. Walden. New York Univ. Sch. of Med., New York, NY; The Neuroscience Institute, San Diego, CA.
- 300** B75 Transcription factor AP-2 γ is essential for the development of both giant cells and the labyrinth layer of the mouse placenta. J. Huang, Y. Ji, A. Nagy, J. Cross, T. Williams. Depts. Craniofacial Biology, Cell and Developmental Biology, UCHSC, Denver CO; Samuel Lunenfeld Research Institute, Toronto, Canada; Univ. of Calgary, Calgary, Canada.
- 301** B76 Initial characterization of the *brachyury* allantois. K.E. Inman, K.M. Downs. Program in Cellular and Molecular Biology; Dept. of Anatomy, Univ. of Wisconsin - Madison, Madison, WI.
- 302** B77 Evidence that PDGF Signaling is Required for Normal Pulmonary Vein Development. S.B. Bleyl, Y. Saijoh, S.E. Klewer, K. Ward, G.C. Schoenwolf. University of Utah, Salt Lake City; Univ. of Arizona, Tucson.
- 303** B78 Sequential Myocardial-Endocardial NFAT Signaling Initiates and Perpetuates Heart Valve Morphogenesis. C. Chang, J.R. Neilson, J. Bayle, J. Gestwicki, I. Graef, G.R. Crabtree. Dept. of Developmental Biology, HHMI, Stanford University.
- 304** B79 Tgf- β family receptors Alk2 and Alk5 play different critical roles in palatogenesis. M. Dudas, A. Nagy, S. Sridurongrit, V. Kaartinen. USC, Childrens Hospital Los Angeles, CA.
- 305** B80 Fgf15 is necessary for proper cardiovascular development. J. Vincentz, C. Murre, A. Baldini, Y. Furuta. Dept. Biochem. and Mol. Biol., Univ. Texas, MDACC; UCSD; Baylor Coll. Med.
- 306** B81 Initiation of mouse neural tube closure requires Rho kinase, but not JNK. P. Ybot-Gonzalez, D. Savery, N.D. Greene, A.J. Copp. Institute of Child Health, UCL, London, UK.
- 307** B82 BMP-3 is an antagonist of BMP and activin signaling in *Xenopus* embryos. L. Gamer, J. Nove, V. Rosen. HSDM and Forsyth Institute Boston, MA.
- 308** B83 Mechanisms of left-right asymmetric gut looping. N.M. Nascone-Yoder, S.H. Grill, J.E. Thompson. Eckerd College, St. Petersburg, FL.
- 309** B84 Expression patterns of intersectin in *Xenopus laevis* embryos. C.E. Fundakowski, K.F. Block, J.M. Thorn. Knox College, Galesburg, IL.
- 310** B85 Hsp47 Expression is Preferentially Associated with Type II Collagen Biosynthesis. J.L. Myhre, W.M. Kulyk, P.H. Krone. Univ. of Saskatchewan, Saskatoon, SK.

Cell Motility and Guidance

- 311** B86 In Vivo Imaging of Growth Cone and Filopodial Dynamics: Contact-Mediated Repulsion Between Sibling Processes of an Identified Cell. M.W. Baker, E.R. Macagno. UC San Diego, La Jolla, CA.

- 312** B87 Rho GTPases Modulate Functionally Distinct Adhesions in Individual Filopodia. K.W. Tosney, J. Schrum, D. Berry. Univ. Michigan; Univ. Michigan; Univ. Michigan.
- 313** B88 EphA4-ephrin interactions in patterning axon projections. C.E. Krull, E.B. Pasquale, K.W. Tosney. Univ. of Michigan, Ann Arbor, MI; The Burnham Institute, La Jolla, CA.
- 314** B89 Different metalloproteases function to regulate axon behaviour at distinct choice points in the optic pathway. C.L. Hehr, S. McFarlane. Univ. of Calgary, Genes and Development Research Group, Calgary, AB, Canada.
- 315** B90 Identification of genes necessary for cranial motor neuron development in zebrafish. K. Cooper, A. Carmany-Rampey, J. Armstrong, C. Moens. HHMI, Division of Basic Science, Fred Hutchinson Cancer Research Ctr., Seattle, WA; Whitman College, Walla Walla, WA.
- 316** B91 The function of the alpha 5 subunit of laminin in neural crest cell development. E.G. Coles, L.S. Gammill, J.H. Miner, M. Bronner-Fraser. Division of Biology, California Institute of Technology, Pasadena, CA; Washington Univ. Sch. of Med., St Louis, MO.
- 317** B92 Monitoring of MEE cell motility and gene expression during mouse palatogenesis. Y. Soeno, T. Hirano, Y. Shimazu, Y. Taya, T. Aoba. Nippon Dental Univ., Tokyo, Japan.
- 318** B93 Loss of plexinD1 sends vascular pattern *out of bounds*. S. Childs, J. Torres-Vasquez, R.E. Lamont, M.C. Fishman, J. Chen, B.M. Weinstein, S.D. Fraser. Biochemistry and Molecular Biology, Univ. of Calgary, AB; Laboratory of Molecular Genetics, NICHD, Bethesda MD; Massachusetts General Hospital, Boston MA; Molecular, Cellular and Developmental Biology, UCLA, Los Angeles CA.
- 319** B94 Control of dorsal-ventral innervation choice in the vertebrate limb. V. Luria, E. Laufer. Columbia Univ., New York, NY.
- 320** B95 Vg1 Restricts Endoderm Cell Fate and Movement During Zebrafish Gastrulation Vg1 Restricts Endoderm Cell Fate and Movement During Zebrafish Gastrulation. A.V. Gore, S. Tao, J. Tian, K. Sampath. Temasek Life Sciences Laboratory, 1, Research Link, National Univ. of Singapore.

Organogenesis

- 321** B96 Hedgehog signaling and ES cell neurogenesis. S. Becker, J. Thorne, A. Bhardwaj, C. Cai, L. Grabel. Wesleyan Univ., Middletown, CT.
- 322** B97 Characterization of *Costal2* in Brain Development and Mammalian Hedgehog Signaling. H. Cheung, R. Mo, X. Zhang, S. Makino, Y. Yoshikawa, N. Lifshitz, J. Chen, C. Hui. Dept. of Medical Genetics and Microbiology, Univ. of Toronto, Toronto, Ontario, Canada; Program in Developmental Biology, Research Institute of The Hospital for Sick Children, Toronto, Ontario, Canada; Dept. of Dermatology, Yamaguchi Univ., 1667-1 Yoshida, Japan
- 323** B98 Generation of neuronal diversity in the chick tectum. N. Fedtsova, E.E. Turner. UCSD, La Jolla, CA; VA Medical Center, San Diego, CA.
- 324** B99 Cross-species screen for novel regulators of enteric nervous system development. T.A. Heanue, V. Pachnis. National Institute for Medical Research, London, UK.
- 325** B100 Regulation of sympathetic nervous system development by HAND bHLH transcription factors. Y. Morikawa, D. McFadden, E. Olson, P. Cserjesi. Dept. Cell Biology and Anatomy, LSU Hlth. Sci. Ctr., New Orleans, LA; Dept. Molecular Biology, Univ. Texas Southwestern Med. Ctr., Dallas, TX.
- 326** B101 Characterization of the *C. elegans* ray formation process via the study of *mab-22* gene. K. So, S. Ho, S. Tsang, R. Yu, K. Chow. Dept. of Biology, Hong Kong Univ. of Sci. and Tech., Clear Water Bay, Kowloon, Hong Kong.
- 327** B102 The stress-inducible Hsp70 is required for normal embryonic lens formation in the zebrafish. T.G. Evans, Y. Yamamoto, W.R. Jeffery, P.H. Krone. Univ. of Saskatchewan, Saskatoon, SK, Canada; Univ. of Maryland, College Park, MD.
- 328** B103 The role of LIM domain-containing proteins in vertebrate eye development. D.S. Ji, M. Lane. Rice Univ., Houston, TX.
- 329** B104 Patterning of the vertebrate eye along the Dorso-Ventral axis. Y. Liu, G. Lupo, G. Barsacchi, R. He, W. Harris. Lab of Visual Information Processing, Institute of Biophysics, CAS, China; Dept. of Anatomy, Univ. of Cambridge, UK; Dept. of Physiology and Biochemistry, Univ. of Pisa, Italy.

- 330** B105 The Role of WNT Signaling in Patterning of the Anterior Segment of the Eye. E.I. Frolova, V.M. Fokina. Univ. of Texas Medical Branch, Galveston, TX.
- 331** B106 A Mechanism of Proliferation of Retinal Progenitor Cells Controlled by *rx* (Rx) Homeobox Gene. T. Furukawa, K. Terada, A. Kitayama, N. Ueno. Osaka Bioscience Institute/PRESTO, JST; Okazaki National Research Institute, National Institute for Basic Biology.
- 332** B107 Fgf3 and Fgf8 are required redundantly for mouse otic induction. S. Mansour, T. Wright. Univ of Utah, Salt Lake City, UT.
- 333** B108 The roles of mouse Fgf4, Fgf8 and Fgf16 during early inner ear development. E.P. Hatch, S.L. Mansour, T.J. Wright. Univ. of Utah, Human Genetics, UT.
- 334** B109 Notch signaling influences the early patterning of *Xenopus laevis*. E.C. Pfeil, S.P. Coleman, K.A. McLaughlin. Dept. of Biology, Tufts Univ., Medford, MA.
- 335** B110 Analysis of a novel zebrafish segmentation mutant. W. Durst, C. Henry, S. Amacher. Univ. of California, Berkeley.
- 336** B111 Analysis of Regulation and Function of *six* Genes in Embryonic Zebrafish. D.A. Bessarab, S. Chong, M. Richardson, V. Korzh. Institute of Molecular and Cell Biology, Singapore.
- 337** B112 Functional analysis of two *Ihh*-target genes. M. Chinenkova, M. Wenzel, S. Schneider, A. Vortkamp. Max-Planck Institute for Molecular Genetics, Berlin, Germany.
- 338** B113 *Ext1* dependent heparan sulfates regulate the range of *Ihh* signaling during endochondral ossification. L. Koziel, M. Kunath, A.P. McMahon, O.G. Kelly, A. Vortkamp. Otto-Warburg Laboratory, Max-Planck-Institute for Molecular Genetics, Berlin, Germany; Dept. of Molecular and Cellular Biology, Harvard Univ., Cambridge, MA; Dept. of Molecular and Cell Biology, Univ. of California, Berkeley, CA.
- 339** B114 *Hoxa2* and Craniofacial Skeletogenesis. N.M. Bobola, E. Kutejova, B. Engist. Max-Planck-Institute of Immunobiology, Freiburg, Germany.
- 340** B115 BMP regulation in pituitary organogenesis. S.W. Davis, S.A. Camper. Dept. of Human Genetics, Univ. of Michigan.
- 341** B116 Pancreatic islet innervation in the context of murine pancreas development. R.E. Burris, M. Hebrok. UC San Francisco Diabetes Ctr., San Francisco, CA; UC San Francisco Diabetes Center, San Francisco, CA.
- 342** B117 Role of beta-catenin in pancreas development. J. Dessimoz, J. Huelsken, P.L. Herrera, A. Grapin-Botton. ISREC, Chemin des Boveresses 155, Case Postale, CH-1066 Epalinges s/Lausanne, CH; Department of Morphology, Geneva Medical School, 1 rue Michel-Servet, 1211 Geneva, CH.
- 343** B118 The expression of Rbp-L during pancreatic development and in various pancreatic cancer cell lines. B.G. Hoffman, T. Ruiz de Algora, C.D. Helgason. BC Cancer Agency, Vancouver, Canada.
- 344** B119 Examining the role of *pdx1* in pancreatic precursor survival, proliferation, and differentiation. L. Wilding, M. Gannon. Dept. of Molecular Physiology and Biophysics and; Dept. of Med., Vanderbilt Univ., Nashville, TN.
- 345** B120 Analysis of diabetes progression in transgenic mice misexpressing the essential pancreatic transcription factor HNF6. E. Tweedie, U.G. Kopsombut, M. Gannon. Dept. of Molecular Physiology and Biophysics and; Dept. of Med., Vanderbilt Univ., Nashville, TN.
- 346** B121 Analysis of SCF function in *Xenopus* primitive hematopoiesis. D. Goldman, L. Berg, J. Christian. Oregon Hlth. and Sciences Univ., Portland.
- 347** B122 The coordinate regulation of pharyngeal development in *C. elegans* by *lin-35/Rb*, *pha-1*, and the ubiquitin pathway. D.S. Fay, B.L. Johanson, X. Qiu. Univ. of Wyoming, Laramie.
- 348** B123 *gob-1* is a HAD hydrolase necessary for intestine development in *Caenorhabditis elegans*. J.D. Kormish, J.D. McGhee. Dept. of Biochemistry and Molecular Biology, Univ. of Calgary, Calgary, Alberta, Canada.
- 349** B124 Ceruloplasmin and liver development in zebrafish. S.N. Korzh, A.V. Emelyanov, Z. Li, V.P. Korzh, Z. Gong. Dept. of Biological Sciences, National Univ. of Singapore; Institute of Molecular and Cell Biology, Singapore.
- 350** B125 The BMP antagonist Noggin is necessary for heart morphogenesis. M. Choi, R.W. Stottmann, J. Klingensmith. Dept. of Cell Biology, Duke Univ. Medical Ctr., Durham, NC.

- 351** B126 Fgf8 is critical for anterior heart field development. E. Meyers, R. Abu-Issa, R. Illagen, M. Kirby, D. Brown, Y. Li, R. Schwartz. Duke Univ. Med. Cen., Durham, NC; Univ. of California, San Francisco, CA; Baylor College of Med., Houston, TX.
- 352** B127 Forces Due to Actin Polymerization Bend the Heart Tube During C-looping. M.C. Rémond, K.S. Latacha, J.A. Fee, E.L. Elson, L.A. Taber. Washington Univ., Dept. of Biomedical Engineering; Washington Univ., Dept. of Biochemistry and Molecular Biophysics.
- 353** B128 Analysis of Myocardial Differentiation in Zebrafish. I.C. Scott, L.A. D'Amico, H. Baier, D.Y. Stainier. UCSF, Dept. of Biochemistry and Biophysics, San Francisco, CA.
- 354** B129 Mesenchyme:angioblast induction during early kidney development. J.A. Kreidberg, X. Gao. Children's Hospital, Harvard Medical School, Boston, MA.
- 355** B130 Role of BMP signaling during the development of the embryonic kidney (pronephros). K. Mizeracka, S. Wawersik, K.A. McLaughlin. Dept. of Biology, Tufts Univ., Medford, MA; Dept. of Cell Biology, Harvard Medical School, Boston, MA.
- 356** B131 Role of fibroblast growth factors in the developing kidney. C.M. Bates, H. Zhao, H. Kegg, S. Grady. Ctr. for Human and Molecular Genetics, Children's Research Institute, Columbus, OH.
- 357** B132 The role of *Osr1* during kidney formation. T. Schultheiss, R. James, Q. Wang, R. Jiang. Molecular and Vascular Biology, Beth Israel Deaconess Medical Ctr. and Harvard Medical School, Boston, MA; Ctr. for Oral Biology and Dept. of Biomedical Genetics, Univ. of Rochester Sch. of Med. and Dentistry, Rochester NY.
- 358** B133 Identification and functional analysis of a pronephric tubule specific gene in *Xenopus laevis*. S. Kim, J. Han. Pohang Univ. of Science and Technology, Kyungbuk, Korea.
- 359** B134 Withdrawn
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- 360** B135 Abnormal development of the intercostal muscles and the rib cage in *Myf5*^{-/-} embryos leads to pulmonary hypoplasia. M.R. Inanlou, B. Kablar. Dalhousie Univ., Halifax, NS, Canada.
- 361** B136 The role of neurotrophins in the esophageal skeletal muscle transdifferentiation and acetylcholine receptor transition. B. Kablar, T. Reddy. Dalhousie Univ., Halifax, NS, Canada.
- 362** B137 Dimerization partners and tissue context regulate Twist activity during myogenesis. M. Wong, M.K. Baylies. Weill GSMS, Cornell Univ.; Sloan-Kettering Institute, New York, NY.
- 363** B138 Touchtone promotes survival of embryonic melanophores in zebrafish. R.a. Cornell, E. Yemm, W. Li, C. d'Alencon, L. Wegman, J.S. Eisen, A. Zahs. Univ. of Iowa, Iowa City, IA; Univ. of Oregon, Eugene, OR; Simpson College, Indianola, IA.
- 364** B139 Alopecia and epidermal hyperplasia in adult male mice lacking normal *Patched2* function. E. Nieuwenhuis, J. Motoyama, Y. Yoshikawa, X. Zhang, R. Mo, M.A. Crackower, C. Hui. Program in Developmental Biology The Hospital for Sick Children, Dept. of Molecular and Medical Genetics Univ. of Toronto Canada; Molecular Neuropathology Group Brain Research Institute Japan; Dept. of Dermatology Yamaguchi Univ. Japan; Amgen Inc., Thousand
- 365** B140 Regulation of early gonadogenesis and organ-specific sexual dimorphism in *C. elegans*. C. Tilmann, L. Mathies, J. Kimble. Univ. of Wisconsin and HHMI, Madison, WI; North Carolina State Univ., Raleigh, NC.
- 366** B141 Specification of the Indifferent Gonad in the Avian Embryo. J.B. Scott, T.M. Schultheiss. Harvard Medical School, Boston MA; Beth Israel Deaconess Medical Center, Boston MA.
- 367** B142 Identification of genes regulating mouse prostate development using serial analysis of gene expression. T. Zhang, T. Ruiz de Algora, B. Hoffman, C.D. Helgason. Dept. of Cancer Endocrinology, BC Cancer Agency, Vancouver, B. C, Canada.
- 368** B143 The expression of the FGF ligand Branchless in the drosophila bridge cells, required for tracheal dorsal trunk elongation, is regulated by the selector genes extradenticle and homothorax. S. Merabet, A. Ebner, M. Affolter. Uni. of Basel 4056, Suisse.
- 369** B144 Origin of the epithelial anlage of the avian bursa of Fabricius. N. Nagy, A. Magyar, I. Olah. Semmelweis Univ., Faculty of Med., Budapest, Hungary.

370 B145 *Mrj*-deficient trophoblast cells exhibit disrupted keratin intermediate filaments. E.D. Watson, C. Geary, J.C. Cross. Univ. of Calgary, Calgary, Canada.

Stem Cells and Tissue Regeneration

371 B146 Early fin primordia of zebrafish larvae regenerate by a similar growth control mechanism with adult regeneration. A. Kawakami, T. Fukazawa, H. Takeda. Univ. of Tokyo, Tokyo 113-0033, Japan.

372 B147 Identification of genes required for blastema formation in zebrafish caudal fin regeneration. G.G. Whitehead, S. Makino, S. Kim, M.T. Keating. Harvard Medical School, Boston, MA.

373 B148 Expression of Hsp 70 during development and limb regeneration in the Axolotl. M. Lévesque, M. Pilote, J. Guimond, S. Roy. Dept. Biochemistry; Dept. Stomatology, Univ. de Montréal, Montréal, Canada.

374 B149 The axolotl: a model for bone regeneration. M. Pilote, M. Lévesque, S. Roy. Dept. Biochemistry; Dept. Stomatology, Univ. de Montréal, Montréal, Canada.

375 B150 The axolotl as a model to study cancer resistance. É. Villiard, O. Moiseeva, G. Ferbeyre, S. Roy. Dept. Biochemistry; Dept. Stomatology, Univ. de Montréal, Montréal, Canada.

376 B151 SHH is a modulator of retina regeneration. J.R. Spence, M. Madhavan, K. Del Rio-Tsonis. Dept. of Zoology, Miami Univ., Oxford, Ohio.

377 B152 Chx10 as a regulator of retinal stem cells. N.S. Dhomen, K.S. Balaggan, J.W. Bainbridge, R.R. Ali, J.C. Sowden. Developmental Biology Unit, Institute of Child Health, UCL, London, UK; Institute of Ophthalmology, London, UK.

378 B153 Neuro-specific regulatory element of nestin is active in different categories of adult stem cells. A.S. Gleiberman, M.G. Rosenfeld, G. Enikolopov. Univ. of California San Diego, LA Jolla, CA 92093; Cold Spring Harbor Laboratory, Cold Spring Harbor, NY.

379 B154 Neuronal differentiation of mesenchymal stem cells. J. VandeVyvere, M. Vrontakis. Univ of Manitoba, Winnipeg, MB.

380 B155 Evaluating Calcium Phosphate-Based Biomaterials as Delivery Vehicles for Human Adult Mesenchymal Stem Cells for Use in Bone Regenerative Medicine. C.Y. Heyward, H. Qidwai, A.T. Loveland, P.G. Campbell, J.S. Doctor. Dept. of Biological Sciences, Duquesne Univ., Pittsburgh, PA; Institute for Complex Engineered Systems and Bone Tissue Engineering Center, Carnegie Mellon Univ., Pittsburgh, PA.

381 B156 Expression profiling of osteogenesis and chondrogenesis in embryonic stem cells. L.A. Davis, N.I. zur Nieden, F.D. Price, D.E. Rancourt. Biochemistry and Molecular Biology, Univ. of Calgary.

382 B157 Retinoic acid and BMP-2 modulate vitamin D3 induced osteogenesis in murine ES cells. N.I. zur Nieden, D.E. Rancourt. Dept. of Biochemistry and Molecular Biology, Univ. of Calgary, Canada.

383 B158 Mechanisms of Myofibroblast Differentiation and Apoptosis: Transgenic Mouse EGFP Culture Model. C. Bertolotto, V. Ubal, S. Wachsmann-Hogiu, D. Acuna, A. Piroozzi, R. De Araujo, A. Moghimi, C.F. Simmons. Dept of Pediatrics; Dept of Surgery, Cedars Sinai Medical Center/UCLA.

384 B159 Enrichment of pancreatic progenitor and beta cells from mouse and human embryonic stem cell (ESC) cultures. V.L. Browning, B.W. Kahan, N.R. Treff, R.K. Vincent, L.M. Jacobson, J.S. Odorico. Univ. of Wisconsin-Madison Sch. of Medicine; Univ. of Wisconsin-Madison Sch. of Med. and WiCell Research Institute.

385 B160 Human Keratinocyte Stem Cells Support Mouse Tooth Formation. Y. Zhang, C. Liu, J. Zhang, W. Liu, Y. Chen, Y. Cao. College of Bioengineering, Fujian Normal Univ., Fuzhou, Fujian, China; Shanghai Tissue Engineering Center, The 9th Peoples Hospital, Shanghai, China; Dept. of Cell and Molecular Biology, Tulane Univ., New Orleans, LA.

386 B161 The characterization of differentiating wild type and mutant trophoblast stem cells. J.A. Quinn, M. Kibschull, E. Winterhager, J. Rossant. Samuel Lunenfeld Research Institute, Mount Sinai Hospital, Toronto ON, Canada; Institute of Anatomy, Univ. Hospital, Essen, Germany.

387 B162 Characterisation of the progenitors for the mouse anteroposterior axis. N. Cambray, V. Wilson. Univ. of Edinburgh.

388 B163 Characterization of presumptive myogenic stem cell populations in the electric fish *S. macrurus*. C. Weber, L. Dudin, G.A. Unguez. NMSU, Las Cruces, NM.

389 B164 Role of Msx genes in tail regeneration in the weakly electric fish, *S. macrurus*. A.S. Clinton, S.J. Tapscott, G.A. Unguez. Biol. Dept., NMSU, Las Cruces, NM; Human Biology, Fred Hutchinson Cancer Research Center, Seattle, WA.

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