

CHEMICAL HERITAGE FOUNDATION

**ARIEL RUIZ i ALTABA**

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview  
Conducted by

William Van Benschoten

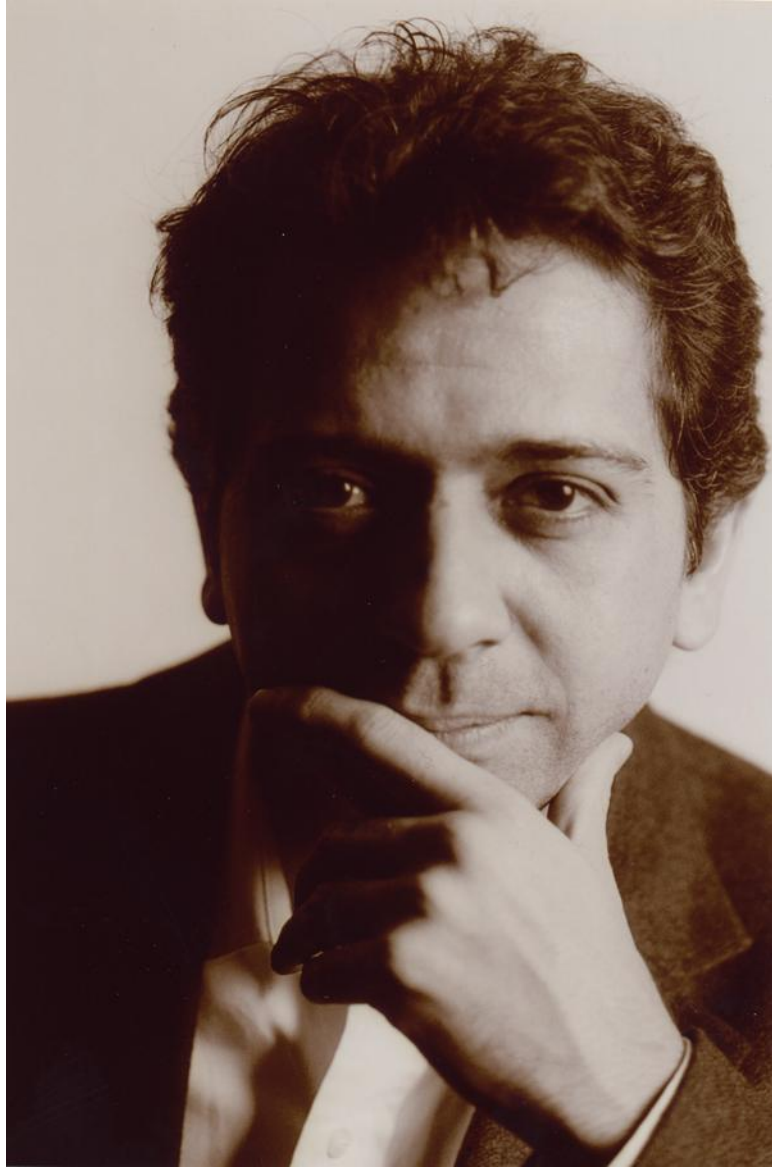
at

University of Geneva Medical School  
Geneva, Switzerland

on

19, 20, and 21 August 2002

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Ariel Ruiz i Altaba

## ACKNOWLEDGEMENT

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

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This Interview Agreement is made and entered into this 11 day of June, 2002 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and ARIEL RUIZ I ALTABA, having an address at Developmental Genetics Program in Cell Biology, New York University, 540 First Avenue, 4<sup>th</sup> Floor, Lab 1, Skirball Institute, New York, New York 10016, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about August 19, 2002, and tentatively entitled "Interview with Ariel Ruiz i Altaba. Altaba" This Agreement relates to the final material originating from the interviews, namely the written manuscript prepared from the tapes, hereinafter called "the Work." The tapes are not included here.

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5. Interviewee will receive from University, free of charge, one bound copy of the typewritten manuscript of the interviews.
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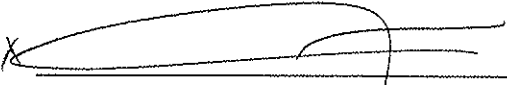
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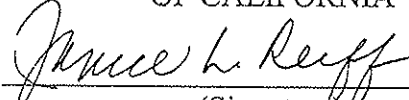
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University and Interviewee have executed this Agreement as of the date first written above.

INTERVIEWEE

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Date 13 June 2003  
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## **ARIEL RUIZ i ALTABA**

1962 Born in Mexico City, Mexico, on 13 November

### Education

1984 A.B., Columbia University  
1989 Ph.D., Biochemistry and Molecular Biology, Harvard University

### Professional Experience

1989-1993 Columbia University, Howard Hughes Medical Institute  
Postdoctoral Training in the Laboratory of Dr. T. M. Jessell

1993-1994 Columbia University, Center for Neurobiology and Behavior  
Associate Research Scientist in the Laboratory of Dr. T. M. Jessell

1994-2000 New York University School of Medicine, Skirball Institute  
Assistant Professor, Department of Cell Biology  
2000-2003 Associate Professor, Department of Cell Biology

2004-present University of Geneva Medical School, Geneva, Switzerland  
Full Professor

### Honors

1987 Paul Mazur Fellowship, Harvard University School of Arts & Sciences  
1989-1993 Postdoctoral Fellowship, Howard Hughes Medical Institute  
1994 Young Investigator Award, Mechanisms of Development  
1995 Whitehead Fellowship for Junior Faculty, New York University  
1997-1999 Basil O'Connor Starter Award, March of Dimes Foundation  
1999-2000 Pew Scholars Program in the Biomedical Sciences Grant  
2001-2003 Hirsch Award  
2004 Louis Jeantet Professorship  
2005 Leenaards Prize

### Selected Publications

Lupski, J., Ruiz Altaba, A. and Godson, G.N. (1984) Promotion, Termination and Anti-

- termination in the rpsU-dnaG-rpoD Macromolecular Synthesis Operon of *E. coli*. *Mol. Gen. Genet.* 195:391-401.
- Ruiz i Altaba, A., Ozaki, L.S., Zavala, F. and Godson, G.N. (1986) Expression of the Plasmodium knowlesi Circumsporozoite Antigen in *E. coli* Directed by Plasmodium Bacterial-like Promoters. *Gene* 41:135-144.
- Ruiz i Altaba, A., Ozaki, L.S., Gwadz, R.W. and Godson, G.N. (1987) Organization and Expression of the Plasmodium knowlesi Circumsporozoite Antigen Gene. *Molec. Biochem. Parasitol.* 23:233-245.
- Ruiz i Altaba, A., Perry-O'Keefe, H. and Melton, D.A. (1987) Xfin: an Embryonic Gene Encoding a Multifingered Protein in *Xenopus*. *EMBO J.* 6:3065-3070.
- Melton, D.A., Ruiz i Altaba, A., Yisraeli, J. and Sokol, S. (1988) Localization and Axis Formation during *Xenopus* Embryogenesis. *Ciba Foundation Symposium Cellular Basis of Morphogenesis.* London 144:16-36.
- Ruiz i Altaba, A. and Melton, D.A. (1989) Bimodal and Graded Expression of the *Xenopus* Homeobox Gene Xhox3. *Development* 106:173-183.
- Ruiz i Altaba, A. and Melton, D.A. (1989) Involvement of the *Xenopus* Homeobox Gene Xhox3 in Pattern Formation along the Anterior-Posterior Axis. *Cell* 57:317-326.
- Ruiz i Altaba, A. and Melton, D.A. (1989) Interaction Between Peptide Growth Factors and Homeobox Genes in the Establishment of Antero-Posterior Polarity in Frog Embryos. *Nature* 341 :33-38.
- Ruiz i Altaba, A. and Melton, D.A. (1990) Axis Formation and the Establishment of Polarity in Frog Embryos. *Trends in Genetics* 6:57-64.
- Ruiz i Altaba, A. (1990) Neural Expression of the *Xenopus* Homeobox Gene Xhox3, Evidence for a Patterning Neural Signal that Spreads Through the Ectoderm. *Development* 108:595-604.
- Ruiz i Altaba, A. (1991) Vertebrate Development: an Emerging Synthesis. *Trends Genetics* 7:276-280.
- Ruiz i Altaba, A. and Jessell, T. (1991) Retinoic Acid Modifies Mesodermal Patterning in Early *Xenopus* Embryos. *Genes and Development* 5:175-187.
- Ruiz i Altaba, A. and Jessell, T. (1991) Retinoic Acid Modifies the Pattern of Cellular Differentiation of the Central Nervous System of Neurula Stage *Xenopus* Embryos. *Development* 112:945-958.
- Ruiz i Altaba, A., Choi, T. and Melton, D.A. (1991) Expression of the Xhox3 Homeobox Protein in *Xenopus* Embryos: Blocking its Early Function Suggests the Requirement of Xhox3 for Normal Posterior Development. *Development Growth and Differentiation.* 33:651-669.
- Ruiz i Altaba, A. (1992) Cooperation of Planar and Vertical Signals in the Induction and Patterning of the *Xenopus* Nervous System. *Development* 115:67-80.
- Ruiz i Altaba, A. and Jessell, T. (1992) Pintallavis, a Gene Expressed in the Organizer and Midline Cells in *Xenopus*. Involvement in the Development of the Neural Axis. *Development* 116:81-93.
- Klar, A., Jessell, T.M. and Ruiz i Altaba, A. (1992) Control of Floor Plate Identity and Function in the Embryonic Nervous System. *Cold Spring Harbor Symp. Quant. Biol. Volume LVII:473-482.*
- Ruiz i Altaba, A. *Xenopus* embryology and molecular biology chapters in *Essential*

- Developmental Biology, A Practical Approach. C.Stern and P. Holland. Eds. Oxford University Press. Oxford (1993).
- Ruiz i Altaba, A. (1993) Induction and Axial Patterning of the Neural Plate: Planar and Vertical Signals. *J. Neurobiology* 24:1276-1304.
- Ruiz i Altaba, A. and Jessell, T.M. (1993) Midline Cells and the Organization of the Vertebrate Neuraxis. *Curr. Op. Gen. and Dev.* 3:633-640.
- Ruiz i Altaba, A., Cox, C., Jessell, T. and Klar, A. (1993) Deregulated Expression of the Midline Transcription Factor *Pintallavis* Induces Ectopic Expression of a Floor Plate Marker. *PNAS* 90:8268-8272.
- Ruiz i Altaba, A., Prezioso, V., Darnell, J. and Jessell, T.M. (1993) Sequential Expression of HNF-3 $\pm$  and HNF-3 $\sim$  in embryonic organizing centers: the Node, Notochord and Floor Plate. *Mech. Dev.* 44:91-108.
- Ruiz i Altaba, A. (1994) Pattern Formation in the Vertebrate Neural Plate. *Trends Neurosci.* 17:233-243.
- Roelink, H., Augsburger, A., Heemskerk, J., Korzh, V., Norlin, S., Ruiz i Altaba, A., Tanabe, Y., Placzek, M., Edlund, T., Jessell, T.M. and Dodd, J. (1994) Floor Plate and Motor Neuron Induction by *vhh- 1*: a vertebrate homolog of *hedgehog* expressed in the notochord. *Cell* 76:761-775.
- Weinstein, D., Ruiz i Altaba, A., Chen, W., Hoodless, P., Jessell, T.M. and Darnell, J. (1994) HNF-3 $\sim$  is required for the Development of the Axial Mesoderm in Mouse Embryos. *Cell* 78:575-588.
- Ruiz i Altaba, A., Roelink, H. and Jessell, T.M. (1995) Restrictions to Floor Plate Induction by *hedgehog* and Winged Helix Genes in the Neural Tube of Frog Embryos. *Mol. Cell. Neurosci.* 6:106-121.
- Ruiz i Altaba, A., Placzek, M., Baldassare, M., Dodd, J. and Jessell, T.M. (1995) Early Stages of Notochord and Floor Plate Differentiation Defined by Normal and Induced Expression of HNF-3 $\sim$  in Chick Embryos. *Dev. Biol.* 170:299-313.
- Ruiz i Altaba, A. (1996) Coexpression of HNF-3 $\sim$  and *Isl-1/2* and mixed distribution of ventral cell types in the early neural tube. *Int. J. Dev. Biol.* 40:1081-1088.
- Ruiz i Altaba, A. and Théry, C. (1996) Involvement of *Livertine*, a hepatocyte growth factor family member, in neural morphogenesis. *Mech. Dev.* 60:207-220.
- Ruiz i Altaba, A. (1997) Catching a Glimpse of *Hedgehog*. *Cell* 90:193-196.
- Lee, J., Platt, K., Censullo, P. and Ruiz i Altaba, A. (1997) *Gli1* is a target of *Sonic hedgehog* that induces ventral neural tube development. *Development* 124:2537-2552.
- Dahmane, N., Lee, J., Robins, P., Heller, P. and Ruiz i Altaba, A. (1997) Activation of *Gli 1* and the *Sonic Hedgehog* Signaling Pathway in Skin Tumors. *Nature* 389:876-881.
- Ruiz i Altaba, A. (1998) Deconstructing the organizer. *Nature* 391:748-749.
- Nothias, F., Fishell, G. and Ruiz i Altaba, A. (1998) Cooperation of intrinsic and extrinsic signals in the determination of regional identity of the posterior neocortex. *Current Biology* 8:459-462
- Brewster, R., Lee, J. and Ruiz i Altaba, A. (1998) *Gli/Zic* factors pattern the neural plate by defining domains of cell differentiation. *Nature* 393:579-583.
- Liu, F., Massagué, J. and Ruiz i Altaba, A. (1998) Carboxy-terminally truncated *Gli3* proteins associate with *Smads*. *Nature Genetics* 20:325-326.
- Ruiz i Altaba, A. (1998) Combinatorial *Gli* gene function in floor plate and neuronal inductions

- by Sonic *hedgehog*. *Development* 125:2203-22 12.
- Ruiz i Altaba, A. (1999) The flower, the gene, the brain and the creative process- book review. *Nature Genetics* 22:229-230.
- Ruiz i Altaba, A. (1999) Gli proteins and *Hedgehog* signaling in development and cancer. *Trends Genetics* 15:418-425.
- Ruiz i Altaba, A. (1999) The works of Gli and the power of *Hedgehog*. *Nature Cell Biology* 1:147-148.
- Dahmane, N. and Ruiz i Altaba, A. (1999) Sonic *hedgehog* regulates the growth and patterning of the cerebellum. *Development* 126:3089-3 100.
- Ruiz i Altaba, A. (1999) Gli proteins encode context-dependent positive and negative functions: implications for development and disease. *Development* 126:3205- 3216.
- Brewster, R., Mullor, J.L. and Ruiz i Altaba, A. (2000) Gli2 functions in FGF signaling during antero-posterior patterning. *Development* 127:4395-4405.
- Aza-Blanc, P., Lin, H., Ruiz i Altaba, A., Kornberg, T. B. (2000) Expression of the vertebrate Gli proteins in *Drosophila* reveals a distribution of activator and repressor activities. *Development* 127:4293-4301.
- Brewster, R. and Ruiz i Altaba, A. (2000) Hexokinase I is a Gli2-responsive gene expressed in the embryonic CNS. *Mech Dev* 99:159-162.
- Ruiz i Altaba, A. *Embryonic Landscapes*. Actar (2001).
- Ruiz i Altaba, A., Gitton, Y. and Dahmane, N. (2001) Embryonic regionalization of the neocortex. *Mech. Dev.* 107:3-11.
- Mullor, J., Dahmane, N., Sun, T. and Ruiz i Altaba, A. (2001) Wnt signals are targets and mediators of Gli function. *Current Biology* 11:769-773.
- Dahmane, N., Sanchez, P., Gitton, Y., Palma, V., Sun, T., Weiner, H. and Ruiz i Altaba, A. (2001) The SHH-Gli pathway in brain growth and tumorigenesis. *Development* 128:5201-5212
- Ruiz i Altaba A., Palma, V, and Dahmane, N. (2002) *Hedgehog*-Gli signaling and the growth of the brain. *Nature Rev. Neurosci.* 3:24-33.
- Mullor, J, and Ruiz i Altaba, A. (2002) *Hedgehog* and the price of Gas. *Bioessays.* 24:22-26.
- Ruiz i Altaba, A., Sanchez, P. and Dahmane, N. (2002) Gli and *Hedgehog* in cancer: tumors, embryos and stem cells. *Nature Rev. Cancer.* 2, 361-372.
- Mullor, J.M., Sanchez, P. and Ruiz i Altaba, A. (2002) Pathways and consequences: *Hedgehog* signaling in human disease. *Trends in Cell Biology.* 12, 562- 569
- Gitton, Y., Dahmane, N., Baik, S., Ruiz i Altaba, A. Neidhardt, L., Scholze, M., Herrmann, B., Kahlem, P., Kahla A., Schrunner, S., Yildirimman, R., Herwig, R., Lehrach, H. and Yaspo, M.L. (2002) A multi-level gene expression analysis of human chromosome 21 orthologs in the mouse: potential insights into Down syndrome. *Nature* 420, 586-590.
- Stecca, B. and Ruiz i Altaba, A. (2002). Therapeutic potential of modulators of the HH-GLI signaling pathway. *J. Biology,* 1:9.
- Erich Roessler, Yangzu Du, Jose L. Mullor, Esther Casas, William P. Allen, Ian Ellis, Gabriele Gillessen-Kaesbach, Elizabeth R. Roeder, Jeffrey E. Ming, Ariel Ruiz i Altaba, Maximilian Muenke (2003) Loss-of-function mutations in the human GLI2 gene cause holoprosencephaly and familial pan-hypopituitarism. *Proc. Natl. Acad. Sci. USA.* 100, 13424-13429.
- Ruiz i Altaba, A., Nguyen, V. and Palma, V. (2003) The emerging design of the neural tube:

- Prepattern, Shh morphogen and Gli code. *Current Opinion in Genetics and Development*. 13, 513-521
- Guerrero, I. and Ruiz i Altaba, A. (2003). Longing for ligand: *hedgehog*, patched and cell death. *Science* 301, 774-776.
- Palma, and Ruiz i Altaba, A. (2004) *Hedgehog*-Gli signaling controls the behavior of cells with stem cell properties in the developing neocortex. *Development* 131,337-345.
- Ruiz i Altaba A., Stecca, B. and Sanchez, P. (2004). Shh-Gli signaling in brain tumors: stem cells and developmental programs in cancer. *Cancer Letters-special issue*. 204, 145-157.
- Sanchez P, Hernandez AM, Stecca B, Kahler AJ, DeGueme AM, Barrett A, Beyna M, Datta MW, Datta S, Ruiz i Altaba A. 2004. Inhibition of prostate cancer proliferation by interference with SONIC *HEDGEHOG*-GLI1 signaling. *Proc Natl Acad Sci U S A* 101:12561-12566.
- Sanchez P, Ruiz i Altaba A. 2005. In vivo inhibition of endogenous brain tumors through systemic interference of *Hedgehog* signaling in mice. *Mechanisms of Development*. 122, 223-230.
- Palma, V., Lim, D., Dahmane, Sanchez, P., Brionne, T.C, Herzberg, C.D., Gttton, Y., Carleton, A., Alvarez-Buylla, A. and Ruiz i Altaba, A. (2005) Shh-Gli signaling controls stem cell behavior in the postnatal and adult brain. *Development* 132, 335-344.
- Sanchez, P. and Ruiz i Altaba, A. (2005) A GLI code for human brain tumors: Regulation of cancer growth by combinatorial GLI function, Submitted.

## ABSTRACT

**Ariel Ruiz i Altaba** was born in Mexico City, Mexico, but was raised in Barcelona, Catalonia, Spain, the youngest of three brothers (the other two are also scientists: a theoretical physicist and an evolutionary biologist). His mother was a painter and a writer; his father a chemical engineer who left academia to start his own business. From an early age Ruiz i Altaba was interested in science and nature, collecting specimens from the sea and hiking a lot. Though he was in a Catholic-leaning school, the fascist doctrine of Spain and of Francisco Franco impacted some of his early schooling until Franco's death in 1975; he considered his childhood pretty typical. Ruiz i Altaba had some good teachers, but many were unequipped to teach the subjects they were assigned, and so there was little- to no depth in any of his science classes.

He matriculated at the University of Barcelona, but in his sophomore year he decided to transfer to New York University (NYU) in order to study molecular biology, a subject that piqued his interest after a lecture about DNA cloning. He spent three months in Angel G. Pellicer's laboratory before moving into G. Nigel Godson's lab after hearing a lecture on bacterial genetics from James R. Lupski (Pew Scholar Class of 1990), who was working in Godson's lab. Ruiz i Altaba finished his undergraduate degree at Columbia University but continued to work in Godson's lab, publishing his first paper, which was on the promotion, termination, and anti-termination in the *rpsU-dnaG-rpoD* macromolecular synthesis operon of *E. coli*. He moved on to graduate study at Harvard University under Douglas A. Melton, researching peptide growth factors and *Xhox3*, a vertebrate homeobox gene for anterioposterior patterning, and then on to a postdoctoral fellowship at Columbia University with Thomas M. Jessell on development and patterning in the nervous system, in particular the *Gli* gene regulation and signaling in *hedgehog*. From Columbia he accepted a position at the Skirball Institute at New York University.

Throughout the interview Ruiz i Altaba reflects on the relationship between art and science and the notion of objectivity. He also talks about the grant-writing process; duties to his professional community; national research funding; the process of writing journal articles; the issue of patents; and the privatization of scientific research. At the end of the interview he discusses the role of scientists in educating the public; using art and the visual image to teach science; competition and collaboration in science; and the role of the Pew Scholars Program in the Biomedical Sciences in his work.

## UCLA INTERVIEW HISTORY

### INTERVIEWER:

William Van Benschoten, Interviewer, UCLA Oral History Program. B.A., History, University of California, Riverside; M.A., History, University of California, Riverside; C. Phil., History, UCLA

### TIME AND SETTING OF INTERVIEW:

**Place:** Ruiz i Altaba's office.

**Dates, length of sessions:** August 19, 2002; August 20, 2002; and August 21, 2002.

**Total number of recorded hours:** 5.0

**Persons present during interview:** Ruiz i Altaba and Van Benschoten.

### CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Van Benschoten held a telephone preinterview conversation with Ruiz i Altaba to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. He also reviewed documentation in Ruiz i Altaba's file at the Pew Scholars Program office in San Francisco, including Ruiz i Altaba's proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members.

### ORIGINAL EDITING:

Carol Squires edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. Words and phrases inserted by the editor have been bracketed.

Ruiz i Altaba reviewed the transcript. He verified proper names and made a number of corrections and additions.

Carol Squires prepared the table of contents. TechniType Transcripts provided the guide to proper names.

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