JOAN MASSAGUÉ, PHD

Director, Sloan Kettering Institute
Alfred P. Sloan Chair
Memorial Sloan Kettering Cancer Center

DEGREES

1975 B.S., University of Barcelona
1978 PhD, Biochemistry, University of Barcelona. Mentor: Joan J. Guinovart

POSITIONS

1979–82 Research Fellow, Brown University. Mentor: Michael P. Czech
1982–85 Assistant Professor of Biochemistry, U. Massachusetts Medical School
1985–89 Associate Professor of Biochemistry, U. Massachusetts Medical School
1989– Alfred P. Sloan Chair, Memorial Sloan Kettering Cancer Center
1989– Professor, Weill-Cornell Graduate School of Medical Sciences, Cornell University
1989–03 Chairman, Cell Biology Program, Memorial Sloan Kettering Cancer Center
1990–13 Investigator, Howard Hughes Medical Institute
2003–13 Chairman, Cancer Biology & Genetics Program, Memorial Sloan Kettering Cancer Center
2014– Director, Sloan Kettering Institute
2014– Director, Sloan Kettering Division, Weill Cornell Graduate School of Medical Sciences
2014– Provost, Gerstner Sloan Kettering Graduate School of Biomedical Sciences

HONORS

Elected membership

1998 Member, European Molecular Biology Organization
1999 Member, American Academy of Arts and Sciences
2000 Member, National Academy of Sciences, USA
2000 Member, American Academy of Microbiology
2004 Member, Royal Academy of Medicine of Spain
2005 Member, Royal Academy of Pharmacy of Spain
2005 Member, Royal Academy of Pharmacy of Catalonia
2006 Member, National Academy of Medicine (formerly, Institute of Medicine), USA
2016 Fellow, American Association for Cancer Research Academy

Awards and Prizes

1979 Extraordinary Doctoral Award, University of Barcelona
1979 Fulbright Foundation Postdoctoral Fellowship
1979 Leandre Cervera Prize, Institut d'Estudis Catalans
1993 King Juan Carlos I Research Prize
1995 City of Barcelona Award
1995 MERIT Grant Award, National Institutes of Health
1998 Josep Trueta Medal
1999 Catalan Research Foundation Prize
2002 Howard Taylor Ricketts Award, The University of Chicago
2003 Gold Medal, Spanish Society of Biochemistry and Molecular Biology
2004 Prince of Asturias Award in Science and Technology
2005 Jiménez Díaz Memorial Prize
2005 MERIT Grant Award, National Institutes of Health
2005 New York City Mayor's Award in Science and Technology
2005 Català de l'Any (Catalan of the Year)
2006 Sant Jordi Cross, Government of Catalonia
2006 Vilcek Prize

2007 Passano Laureate Prize
2007 Massachusetts General Hospital Award in Cancer Research
2008 Frontiers Prize in Biomedicine, BBVA Foundation
2008 Inaugural Breast Cancer Award, American Association for Cancer Research
2009 G.H.A. Clowes Memorial Award, American Association for Cancer Research
2009 Dexeus Foundation Prize
2010 Feodor Lynen Medal, Nature-Miami Winter Symposia
2010 Doctor Honoris Causa, University of Jaén
2010 Gold Medal, Queen Sofia Spanish Institute
2011 Robert J. and Claire Pasarow Prize in Cancer Research
2011 Breast Cancer Innovator Award, Department of Defense
2012 Paget-Ewing Award, Metastasis Research Society
2012 Lluís Carulla Honor Prize
2013 American Italian Cancer Foundation Prize
2013 Advanced Breast Cancer Award
2014 National Culture Award, Catalonia
2014 National Prize for Research in Biology, Spain
2015 Charles Rodolphe Brupbacher Prize for Cancer Research
2016 Pezcoller Foundation-AACR International Award for Cancer Research

Honorary Lectures

1993 C.-H. Li Lecture, U.C. Berkeley
1995 Stein Lecture, U.C. San Diego
1996 Swerdling Lecture, DFCI, Boston
1996 Griffith Lecture, St. Louis University
1997 Honors Lecture, NYU Medical Center
1998 Keynote, ASMBM *Regulation of Bone*
1998 Lurie Lecturer, Northwestern University
1999 Ochoa Lecture, CSIC, Madrid
1999 Keynote, Cell Proliferation Gordon Conf
2000 Carter-Wallace Lecture, Princeton U
2000 Porter Lecture, Amer. Soc. Cell Biol.
2001 Avioli Lecture, Washington University
2002 Keynote, Juselius Symposium, Helsinki
2003 Viñuela Lecture, CSIC, Madrid
2003 Cell Signalling Lecture, U Dundee
2003 Keynote, Phosphatases EMBO Conference
2003 Sols Lecture, SEBBM Annual Meeting
2004 Tyler Lecture, CalTech
2005 Keynote, Cancer Therapy Keystone Symp
2005 Keynote, Cancer & Develop. Keystone Symp
2005 Keynote, TGFβ & Disease Keystone Symp
2005 Steelman Lecture, U North Carolina
2005 Hofmann Lecture, U Pittsburgh
2006 Datta Lecture, FEBS Annual Meeting
2006 Centennial Lecture, Institut d'Estudis Catalans
2007 Ingram Lecture, Vanderbilt University
2007 Keynote, Mammary Gland Biology Gordon Conf
2008 Keynote, Metastasis Society-AACR Conf.
2008 Keynote, European Assoc. Neurooncology
2008 Harvey Lecture, New York
2009 Keynote, MicroRNA & Cancer Keystone Symposium
2009 Keynote, Beatson Conference on Metastasis
2009 Keynote, U Turku Symposium on Metastasis

2009 Keynote, Wnt Signaling EMBO Workshop
2010 Dulbecco Lecture, Salk Institute
2010 Lynen Lecture, University of Miami
2010 Eppley Visiting Professor, U Nebraska
2010 Keynote, Nature-CNIO Cancer Symposium
2011 Keynote, TGFβ and Immunity Keystone Symposium
2011 Cooper Lecture, Huntsman Institute, U Utah
2011 Sternlicht Lecture, Case Western Reserve U
2011 Eminent Lecture, National Cancer Institute
2011 Hudson Lecture, Washington U
2011 Feodor Lynen Lecture, IUBMB/PABMB
2011 Isaiah J. Fidler Lecture, MDACC
2012 Bernard Fisher Lecture, U Pittsburgh
2012 Novartis Cancer Lecture, UC Berkeley
2012 Ted Couch Lecture, Moffitt Cancer Center
2013 WALS Lecture, National Institutes of Health
2014 Mendel Lecture, Brno, Czech Republic
2015 Keynote, Stem Cell & Cancer Gordon Conference
2015 Keynote, Developmental Biology and Cancer, AACR
2016 Rolf Sammet Guest Professor, Frankfurt University

ADVISORY BOARDS

1986–89 Member, Physiological Chemistry Study Section, National Institutes of Health
1990–96 Scientific Council, National Institute of Diabetes, Digestive and Kidney Diseases
1992–96 Scientific Advisory Board, Damon Runyon–Walter Winchell Cancer Fund
1996–00 Board of Scientific Advisors, National Cancer Institute
1998–10 External Advisory Board, MD Anderson Cancer Center
1999–03 Scientific Advisory Board, Searle Scholars Program
2000–04 External Advisory Board, Fox Chase Cancer Center
2000–05 Scientific Advisor, Barcelona Science Park, University of Barcelona
2000–08 Scientific Advisory Board, Lustgarten Foundation for Pancreatic Cancer Research
2000–14 Member and Chair, Scientific Advisory Board, CNIO, Madrid
2004–10 Scientific Advisory Board, Acceleron Pharmaceuticals Inc
2006–13 Adjunct Director, Institute for Research in Biomedicine Barcelona
2009–12 Board of Directors, American Association for Cancer Research
2010–15 Board of Trustees, The Vilcek Foundation
2012–14 External Advisory Board, Kimmel Stem Cell Center, New York University
2013– Scientific Advisory Board, Scholar Rock, Inc.
2014– Chair, External Advisory Board, Institute for Research in Biomedicine Barcelona
2015– Scientific Review Board, Howard Hughes Medical Institute
2015– External Advisory Board, Salk Institute Cancer Center

EDITORIAL BOARDS

1987–92 Journal of Biological Chemistry
1993– Journal of Cell Biology
2000–05 Proceedings of the National Academy of Sciences USA
2002–07 Journal of Clinical Investigation
2005– EMBO Journal
2007– Molecular Oncology
2008– Cell Research
2009– Cell
2009– Genes & Development
2009– EMBO Molecular Medicine
2011– Cancer Discovery
2012– eLife

SYMPOSIA ORGANIZER

1997 Juan March Symposium, Madrid, *TGFβ Signalling*
1998 Gordon Conference, New Hampshire, *Peptide Growth Factors*
2000 Juan March Symposium, Madrid, *Tumor Suppressor Networks*
2000 CNIO Symposium, Madrid, *Mechanisms of Invasion and Metastasis*
2003 AACR Conference, La Jolla, *TGFβ Family in Cancer and Other Diseases*
2006 AACR Conference, La Jolla, *TGFβ in Cancer and Other Diseases*
2008 Keystone Symposium, *The TGFβ Family in Homeostasis and Disease*
2008 Barcelona Biomed Conference, *Metastasis Genes and Functions*
2010 NYAS Conference, Barcelona, *Towards Personalized Cancer Medicine*

SOCIETIES

American Society of Biochemistry and Molecular Biology
American Society for Microbiology
American Association for Cancer Research
American Society for Cell Biology
Sociedad Española de Bioquímica y Biologia Molecular
Institute d'Estudis Catalans

SUMMARY OF CONTRIBUTIONS *h-index: ~160* *Citations: ~100,000*

Insulin, IGF, and TGFα receptors (1976-1995)

- Subunit structure of receptors for insulin (Massagué et al *PNAS* 1980), insulin-like growth factors (Massagué et al *JBC* 1981) and nerve growth factor (Massagué et al *JBC* 1981).
- TGFα and the juxtacrine hypothesis: TGFα as a ligand for EGF receptor (Massagué *JBC* 1983). TGFα as a membrane-anchored growth factor for juxtacrine signaling (Teixidó et al Nature 1987; Anklesaria et al *PNAS* 1990) and regulated shedding of ectodomain (Pandiella et al. *PNAS* 1991; Bosenberg et al *Cell* 1992; Arribas et al *JCB* 1995).

The TGFβ pathway (1982-present)

- Discovery of TGFβ receptors (Cheifetz et al, *Cell* 1987), receptor cloning (López et al. *Cell* 1991; Attisano et al *Cell* 1992), elucidation of activation mechanism (Wrana et al *Nature* 1994) and X-ray crystal structure (Huse et al *Cell* 1999; Huse et al. *Mol Cell* 2001).
- Identification of Smad proteins as TGFβ and BMP signal transducers (Liu et al *Nature* 1996), Smad activation (Lagna et al. *Nature* 1996), deactivation (Lo et al *Nat. Cell Biol.* 1999; Gao et al *Mol. Cell* 2009), regulation (Kretzschmar et al *Nature* 1997; Ulloa et al *Nature* 1999; Sapkota et al *Mol. Cell* 2007), and Smad action switch Alarcón et al *Cell* 2009; Aragón et al *Genes Dev.* 2011).
- Elucidation of Smad X-ray crystal structures (Shi et al. *Nature* 1997; Wu et al *Science* 2000; Wu et al *Mol. Cell* 2001) and Smad transcriptional (Wotton et al. *Cell* 1999; Hata et al *Cell* 2000; Chen et al *Cell* 2002; Seoane et al *Cell* 2004) and chromatin binding mechanisms (He et al *Cell* 2006; Xi et al *Cell* 2011).
- Discovery of CDK inhibitors p27Kip1 and p57Kip2 (Polyak et al *Cell* 1994; Lee et al *Genes Dev.* 1995), X-ray crystal structure (Russo et al. *Nature* 1996), and function in TGFβ action (Reynisdóttir et al *Genes Dev.* 1995; *Genes Dev.* 1997; Scandura et al *PNAS* 2004)
- Identification of TGFβ roles in adult tissue homeostasis: cell cycle control (Laiho et al. *Cell* 1990; Chen et al. *Cell* 2002; Seoane et al. *Nature* 2002; Seoane et al *Cell* 2004), control of hematopoietic and immune homeostasis (Ohta et al *Nature* 1987; Thomas et al *Cancer Cell* 2004; He et al *Cell* 2006).

Metastasis genes and pathways (2002-present)

- Role of TGFβ in metastasis (Yin et al *JCI*; 1999; Siegel et al *PNAS* 2003; Kang et al *PNAS* 2005; Gomis et al *Cancer Cell* 2006; Padua et al *Cell* 2008); and basis for dual role of TGFβ in cancer (David et al *Cell* 2016).
- Identification of genes and functions for breast cancer metastasis to **bone** (Kang et al. *Cancer Cell* 2003; Kang et al *PNAS* 2005; Zhang et al *Cancer Cell* 2009; Zhang et al *Cell* 2013), **lung** (Minn et al *Nature* 2005; Gupta et al *Nature* 2007; Padua et al *Cell* 2008; Oskarsson et al *Nature Med* 2011; Chen et al *Cancer Cell* 2011), and **brain** (Bos et al *Nature* 2009; Nguyen et al *Cell* 2009; Valiente et al *Cell* 2014; Chen et al *Nature* 2016).
- Identification of metastasis-suppressor microRNAs (Tavazoie et al *Nature* 2008), epigenetic determinants of metastasis (Vanharanta et al *Nature Med.* 2013), and stromal selection of organ specific metastatic traits (Zhang et al *Cell* 2013).
- The tumor self-seeding hypothesis: promulgation (Norton & Massagué, *Nature Med* 2006) and experimental demonstration (Kim et al *Cell* 2009), and links to chemoresistance (Acharyya et al *Cell* 2012) and resistance to target therapy (Obenauf et al *Nature* 2015).
- Molecular basis for metastatic latency and immune evasion (Malladi et al *Cell* 2016)

RESEARCH PUBLICATIONS

245. Wang, Q., Zou, Y., Nowotschin, S., Kim, S.Y., Xi, Q., Zhang, C., Su, J., Shu, W., Hadjantonakis, A.K., and Massagué, J. A p53-Wnt-Nodal network driving mesendoderm specification. *Submitted for publication*

244. Chen, Q., Boire, A., Jin, X., Valiente, M., Er, E.E., Lopez-Soto, A., Pawta, R., Shah, H., Xu, K., Cross, J.R., and Massagué, J. Carcinoma-astrocyte gap junctions promote brain metastasis by cGAMP transfer. **Nature** *in press* (2016)

243. Malladi, S., Macalinao, D., Jin, X., He, L., de Stanchina, E.,, and Massagué, J. Metastatic latency and immune evasion through autocrine inhibition of WNT. **Cell** 165, 45-60 (2016)

- *Commentaries*: Research Highlights, **Nature** 531, 552 (2016);

242. David, C.J., Huan, Y.-H., Chen, M., Su, J., Bardeesy, N., Iacobuzio-Donahue, C., and Massagué, J. TGF-β tumor suppression through a lethal EMT. **Cell** 164, 1015-1030 (2016)

- *Commentaries*: Gupta S. and Maitra, A. **Cell** 164, 840-842 (2016); Strzyz, P. **Nat. Rev. Mol. Cell Bio.** In press (2016); Bledsoe, K. **Cancer Disc.** in press (2016); Ferrarelli, L.K. **Sci. Signal.** 9:415, ec60 (2016)

241. Jacob, L.S., Vanharanta, S., Obenauf, A.C., Pirun, M., Viale, A., Socci, N.D., and Massagué, J. Metastatic competence can emerge with selection of pre-existing oncogenic alleles without a need of new mutations. **Cancer Res.** 75, 3713-3719 (2015) PMC4573898

240. Obenauf, A.C., Zou, Y., Ji, A.L., Vanharanta, S., Shu, W., Shi, H., Kong, X., Bosenberg, M.C., Wiesner, T., Rosen, N., Lo, R.S., and Massagué, J. Therapy induced tumour secretomes promote resistance and tumour progression. **Nature** 520, 368-372 (2015) PMC4507807

- *Commentaries*: Bernards, R. **Cell Res.** 25, 763-764 (2015); Killock, D. **Nat. Rev. Clin. Oncol.** 12, 309 (2015); Gough, N. R. **Sci. Signal.** ec102 (2015).

239. Sevenich, L. Bowman, R.L., Mason, S.D., Quail, D.F., Rapaport, F., Elie, B.T., Brogi, E., Brastianos, P.K., Hahn, W.C., Holsinger, L.J., Massagué, J., Leslie, C.S. and Joyce, J.A. Analysis of tumor- and stroma-supplied proteolytic networks reveals a brain-metastasis-promoting role for cathepsin S. **Nature Cell Biol.** 6, 876-888 (2014) PMC4249762

238. Vanharanta, S., Marney, C.B. Shu, W., Valiente, M., Zou, Y., Mele, A., Darnell R.B., and Massagué, J. Loss of the multifunctional RNA-binding protein RBM47 as a source of selectable metastatic traits in breast cancer. **eLife** Jun 4:e02734 (2014) doi: 10.7554/ eLife.02734; PMC4073284

237. Morales, M., Arenas1, E.J., Urosevic, J., Guiu, M., Fernández, E., Planet, E., Fenwick, R.B., Fernández, S., Salvatella, X., Reverter, D., Carracedo, A., Massagué, J., Gomis, R.R. RARRES3 suppresses breast cancer lung metastasis by regulating adhesion and differentiation. **EMBO Mol. Med.** 6, 865-881 (2014) PMC4119352

236. Valiente, M., Obenauf, A.C., Jin, X., Chen, Q., Zhang, X.H.F., Lee, D.J., Chaft, J.E., Kris, M.G., Huse, J.T., Brogi, E. and Massagué, J. Serpins promote cancer cell survival and vascular cooption in brain metastasis. **Cell** 156, 1002-1016 (2014) PMC3988473

- *Commentaries*: Ye, W. **EMBO J.** 33, 786-787, 2014; Pezzela, F. and Harris, A.L. **New Engl. J. Med.** 370, 2146-7, 2014; Erler, J.T. **Nature** 508, 46-47, 2014; Hutchinson, L, **Nat. Rev. Clin. Oncol.** 11, 241, 2014; Zaromytidou, A. **Nature Cell Biol.**, 16, 307 (2014); Ferrarelli, L.K. **Sci. Signal. 7**, ec72, 2014; **Cancer Disc.** DOI: 10.1158/2159-8290.CD-RW2014-057.

235. Stankic, M., Pavlovic, S., Chin, Y., Brogi, E., Padua, D., Norton, L., Massagué, J. and Benezra, R. TGFβ-ID1 signaling opposes Twist and promotes breast cancer lung colonization via a mesenchymal-to-epithelial transition. **Cell Reports** 5, 1228-1242 (2013). PMC3891470

234. Zhang, X. H.-F., Jin, X., Malladi, S., Kim, J.Y., Wen, Y.H., Brogi, E., Smid, M., Foekens, J. and Massagué, J. Selection of bone metastasis seeds by mesenchymal signals in the primary tumor stroma. **Cell** 154, 1060-1073 (2013). PMC3974915

- *Commentaries*: Guise, T.A. **Cell** 154, 957-959, 2013.

233. Vanharanta, S., Shu, W., Brenet, F., Hakimi, A.A., Heguy. A., Viale, A., Reuter, V.E., Hsieh, J.J-D., Scandura, J.M., and Massagué, J. Epigenetic expansion of VHL-HIF signal output drives multi-organ metastasis in renal cancer. **Nature Med.** 19, 50-56 (2013) PMC3540187

- *Commentaries*: McCarthy, N. **Nat. Rev. Cancer** 13, 78, 2013.

232. Calón, A., Espinet, E., Palomo-Ponce, S., Tauriello, D.V.F., Iglesias, M., Céspedes, M.V., Sevillano, M., Nadal, C., Jung, P., Zhang, X.H.F., Byrom, D., Rivera, A., Rossell, D., Mangues, R., Massagué, J., Sancho, E., Batlle, E. Dependency of colorectal cancer on a TGF-β-driven program in stromal cells for metastasis initiation. **Cancer Cell** 22, 571-584 (2012) PMC3512565

- *Commentaries*: Bhowmick, N. **Cancer Cell** 22, 563-4, 2012; Wrana JL, Attisano L **EMBO J** 31, 4486-7, 2012

231. Aragón, E., Goerner, N., Xi, Q., Lopez, T., Gao, S., Massagué, J. and Macias, M.J. Structural basis for the versatile interactions of Smad7 with regulator WW domains in TGF-b pathways. **Structure** 20, 1726-1736 (2012) PMC3472128

- *Commentaries*: Sudol, M. **Structure** 20, 1619-1620.

230. Acharyya, S., Oskarsson, T., Vanharanta, S., Kim, J., Morris, P.G., Manova-Todorova, K., Leversha, M., Hogg, N., Norton, L., Brogi, E. and Massagué, J. A CXCL1 paracrine network links cancer chemoresistance and metastasis. **Cell** 150, 165-178 (2012) PMC3528019

- *Commentaries*: Gough, N. R. **Sci. Signal.** 5, ec183 (2012); Seton-Rogers, S. **Nat. Rev. Cancer** 12, 507 (2012); Villanueva, M.T. **Nat. Rev. Clin. Oncol.** 129 (2012); Aranda, V. **Nat. Med.** 18, 1192 (2012); Feliciano, P. **Nat. Genet.** 44, 840 (2012)

229. Huang, J., Li, Y.M., Massague, J., Sicheneder, A., Vallera, D.A., Hall, W.A. Intracerebral infusion of the bispecific targeted toxin DTATEGF in a mouse xenograft model of a human metastatic non-small cell lung cancer. **J. Neurooncol.** 109, 229-238 (2012) PMID 22696210

228. Xi, Q., Wang, Z., Zaromytidou, A., Zhang, X. H.-F., Chow-Tsang, L.F., Liu, J.X., Kim, H., Manova-Todorova, K., Kaartinen, V., Studer, L., Mark, W., Patel, D.J. and Massagué, J. A poised chromatin platform for TGF-β access to master regulators. **Cell** 147, 1511-1524 (2011) PMC3582033

227. Lu, X., Mu, E., Wei, Y., Riethdorf, S., Yang, Q., Yuan, M., Yan, J., Hua, Y., Tiede, B.J., Lu, X., Reiss, M., Haffty, B.G., Pantel, K., Massagué, J., and Kang, Y. VCAM-1 promotes osteolytic expansion of indolent bone micrometastasis of breast cancer by engaging α4β1-positive osteoclast progenitors. **Cancer Cell** 20, 701-714 (2011) PMC3241854

- *Commentaries*: Hynes, R.O. **Cancer Cell** 20, 689-690 (2011).

226. Chen, Q., Zhang, X.H.-F., and Massagué, J. Macrophage binding to receptor VCAM-1 transmits survival signals in metastatic breast cancer cells that invade the lungs. **Cancer Cell** 20, 538-549 (2011) PMC3293160

- *Commentaries*: Hynes, R.O. **Cancer Cell** 20, 689-690 (2011).

225. Aragón, E., Goerner, N., Zaromytidou, A.-I., Xi, Q., Escobedo, A., Massagué, J.*, Macias, M.J. A Smad action-turnover switch operated by WW domain readers of a phosphoserine code. **Genes Dev.** 25, 1275-1288 (2011) (*Corresponding author) PMC3127429

224. Oskarsson, T., Acharyya, S., Zhang, X.H.F, Tavazoie, S., Morris, P.G., Downey, R., Manova-Todorova, K., Brogi, E. and Massagué, J. Breast cancer cells produce tenascin-C as a metastatic niche component to colonize the lungs. **Nature Med.** 17, 867-874 (2011) PMC4020577

- *Commentaries*: Mattei et al. **Cancer Cell** 20, 139-141 (2011).

223. Gucalp, A. Sparano, J.A., Caravelli, J., Santamauro, J., Patil, S., Abbruzzi, A., Pellegrino, C., Bromberg, J., Dang, C., Theodoulou, M., Massagué, J., Norton, L., Hudis, C., and Traina, T.A. Phase II trial of saracatinib (AZD0530), an oral src-inhibitor for the treatment of patients with hormone receptor negative metastatic breast cancer **Clin. Breast Cancer** 11, 306-311. (2011) PMC3222913

222. Fang, F., Turcan, S., Rimner, A., Kaufman, A., Giri, D., Morris, L.G.T., Shen, R., Seshan, V., Mo, Q., Heguy, A., Baylin, S.B., Ahuja, N., Viale, A., Massague, J., Norton, L., Vahdat, L.T., Moynahan, M. and Chan, T.A. Breast cancer methylomes establish an epigenomic foundation for metastasis. **Science Trans. Med.** 3, 75ra25 (2011) PMC3146366

221. Schultz, N., Marenstein, D.R., De Angelis, D.A., Wang, W.-Q., Nelander,S., Jacobsen, A., Marks, D.S., Massagué, J. and Sander, C. Off-Target effects dominate a large-scale RNAi screen for modulators of the TGFbeta pathway and reveal microRNA regulation of *TGFBR2*. **Silence** 2:3 (2011) PMC3068080

220. Png, K.J., Yoshida, M., Zhang, X.H.F., Shu, W., Lee, H., Rimner, A., Chan, T.A., Comen, E., Andrade, V.P., Kim, S.W., King T.A., Hudis C.A., Norton L., Hicks, J., Massagué, J. and Tavazoie, S. MicroRNA-335 inhibits tumor reinitiation and is silenced through genetic and epigenetic mechanisms in human breast cancer. **Genes Dev.** 25, 226-231, (2011) PMC3034897

219. Arnal-Estapé, A., Tarragona, M., Morales, M., Guiu, M., Nadal, C., Massagué, J., and Gomis, R.R. HER2 silences tumor suppression in breast cancer cells by switching C/EBPβ isoforms. **Cancer Res.** 70, 9927-9936 (2010) PMID 21098707

218. Oskarsson, T., Nagorny, P., Krauss, I., Perez, L., Mandal, M., Yang, G., Ouerfelli, O., Xiao, D., Moore, M.A.S., Massagué, J., and Danishefsky S.J. Diverted total synthesis leads to the generation of cell-migration inhibitors for treatment of tumor metastasis: In vivo and mechanistic studies on the migrastatin core ether analog. **J. Amer. Chem. Soc.** 132, 3224-3228 (2010) PMC2863049

217. Kim, M.-Y., Oskarsson, T., Acharyya, S., Nguyen, D.X., Zhang, X H.-F., Norton, L., and Massagué, J. Tumor self-seeding by circulating cancer cells. **Cell** 139, 1315-1326 (2009) PMC2810531

- *Commentaries*: Leung, C.T. and Brugge, J.S. **Cell** 139, 1226-1228 (2009); Aguirre-Ghiso, J.A. **Breast Can. Res.** 12, 304 (2010); Hahnfeldt, P. **Future Oncol.** 6, 681-685 (2010)

216. Alarcón, C., Zaromytidou, A.I., Xi, Q., Gao, S., Yu, J., Fujisawa, S., Barlas, A., Miller, A.N., Manova-Todorova, K., Macias, M.J., Sapkota, G., Pan, D., and Massagué, J. Nuclear

CDKs drive Smad transcriptional action and turnover in BMP and TGFβ pathways. **Cell** 139, 757-769 (2009) PMC2818353

- *Commentaries*: Chen, Y.G. and Wang, X.-F. **Cell** 139, 658-660 (2009)

215. Gao, S., Alarcón, C., Sapkota, G., Rahman, S., Chen, P-Y., Goerner, N., Macias, M.J., Erdjument-Bromage, H., Tempst, P., and Massagué, J. Ubiquitin ligase Nedd4L targets activated Smad2/3 to limit TGFβ signaling. **Mol. Cell** 36, 457-468 (2009) PMC2796330

- *Commentaries*: Chen, Y.G. and Wang, X.-F. **Cell** 139, 658-660 (2009)

214. Lu, X., Wang, Q., Van Poznak, C., Fleisher, M., Reiss, M., Massagué, J. and Kang, Y. ADAMTS1 and MMP1 proteolytically engage EGF-like ligands in an osteolytic signaling cascade for bone metastasis. **Genes Dev.** 23, 1882-1894 (2009) Epub Jul 16, 2009. PMC2725946

- *Commentaries*: Guise, T. **Genes Dev**. 23, 2117-2123 (2009)

213. Zhang, X.H.F., Wang, Q., Gerald, W.L., Hudis, C.A., Norton, L., Smid, M., Foekens, J.A. and Joan Massagué, J. Latent bone metastasis in breast cancer tied to Src-dependent survival signals. **Cancer Cell** 16, 67-78 (2009) PMC2749247

- *Commentaries*: Sgroi, D.C. **Cancer Cell** 16, 1-2 (2009)

212. Nguyen, D.X., Chiang, A.C., Zhang, X.H.F., Kim J.Y., Kris, M.G., Ladanyi, M., Gerald, W.L., and Massagué, J. WNT/TCF signaling through LEF1 and HOXB9 mediates lung adenocarcinoma metastasis. **Cell** 138, 51-62 (2009) Epub Jul 2, 2009. PMC2742946

- *Commentaries*: McCarthy, N. **Nature Rev. Cancer** 9, 610-611 (2009)

211. Bos, P.D., Zhang, X.H.F., Nadal, C., Shu, W., Gomis, R.R., Nguyen, D.X., Minn, A.J., Van de Vijver, M., Gerald, W.L., Foekens, J.A., and Massagué, J. Genes that mediate breast cancer metastasis to the brain. **Nature** 459, 1005-1009 (2009) Epub May 6, 2009. PMC2698953

- *Commentaries*: Seton-Rogers, S. **Nature Rev. Cancer** 9, 460-461 (2009); Hu, G. et al. **J. Mol. Cell. Biol.** 1, 3-5 (2009)

210. Serganova, I., Moroz, E., Vider, J., Gogiberidze, G., Moroz, M., Pillarsetty, N., Doubrovin, M., Minn, A., Thaler, H., Massagué, J., Gelovani, J. and Blasberg, R. Multimodality imaging of TGFß signaling in breast cancer metastasis. **FASEB J.** 23, 2662-2672 (2009) PMC2717767

209. Padua, D., Zhang, X. H.-F., Wang, Q., Nadal, C., Gerald, W.L. Gomis, R., and Massagué, J. TGFß primes breast tumors for lung metastasis seeding through angiopoietin-like 4. **Cell** 133, 66-77 (2008) PMC2390892

- *Commentaries*: Welm, A.L. **Cell** 133, 27-28 (2008)

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80. Aggarwal, K. and Massagué, J. TGF-β pathway regulation: the ubiquitin removal chapter. **Nature Cell Biol.** 14, 656-657 (2012).
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78. Massagué, J. and Xi, Q. TGF-β control of stem cell differentiation genes. **FEBS Lett.** 586, 1953-1958 (2012)
77. Oskarsson, T. and Massagué, J. Extracellular matrix players in metastatic niches. **EMBO J.** 31, 254-256 (2011)
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74. Comen, E. Norton, L. and Massagué, J. Clinical implications of cancer self-seeding. **Nature Rev. Clin. Oncol.** 8, 369-377 (2011)

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72. Nguyen, D.X, Bos, P.D. and Massagué, J. Metastasis: from dissemination to organ-specific colonization. **Nature Rev. Cancer** 9, 274-284 (2009)

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67. Minn, A. J. and Massagué, J. Invasion and metastasis. In ***Cancer: Principles & Practice of Oncology***, 8th Edition (V.T. DeVita, Jr, T.S. Lawrence, and S.A. Rosenberg eds.) pp. 117-134. (2008)

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64. Li. F., Tiede, B., Massagué, J. and Kang, Y. Beyond tumorigenesis: Cancer Stem cells and metastasis. **Cell Res.** 17, 3-14 (2007)

63. Gupta, G.P. and Massagué, J. Cancer metastasis: building a framework **Cell** 127, 679-695 (2006)

62. Norton, L. and Massagué, J. Is cancer a disease of self-seeding? **Nature Med.** 12, 875-878 (2006)

61. Massagué, J. and Gomis, R. The logic of TGFβ signaling. **FEBS Lett** 580, 2811-2820 (2006)

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2. U.S. Patent 5,719,120: Use of endoglin polypeptides for modifying the regulatory activity of TGF-beta. J. Massagué, M. Letarte, C. Bernabeu and S. Cheifetz. Issued Feb 17, 1998

3. U.S. Patent 5,830,847: Soluble TGF-beta-binding endoglin polypeptides and homodimers. M. Letarte, J. Massagué, C. Bernabeu, S. Cheifetz. Issued Nov 3, 1998

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5. U.S. Patent 6,025,480: Isolation of nucleic acid molecules encoding p57 Kip2 and use of same. J. Massagué. Issued Feb 15, 2000

6. U.S. Patent 6,242,575: Antibodies for detecting p27 protein. J. Massagué, J.M. Roberts, A. Koff and K. Polyak. Issued Jun 5, 2001

7. U.S. Patent 6,316,208: Methods for determining isolated p27 protein levels and uses thereof. J.M. Roberts, Porter, P.L., K. Polyak, J. Massagué and A. Koff. Issued Nov 13, 2001

8. U.S. Patent 6,355,774: Isolated p27 protein. J. Massagué, J.M. Roberts, A. Koff and K. Polyak. Issued Mar 12, 2002

9. U.S. Patent 6,635,450: Isolated p27 protein, nucleic acid molecules encoding same, methods of identifying agents acting on same, and uses of said agents. J. Massagué, J.M. Roberts, A. Koff and K. Polyak. Issued Oct 21, 2003

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11. U.S. Patent 7,829,066: Assay for anti-metastatic agents. J. Massagué and L. Norton. Issued Nov 09, 2010

12. U.S. Patent 8,178,505: Genes that predict and mediate breast cancer metastasis to the lung. J. Massagué, A. Minn and G. Gupta. Issued May 15, 2012

LABORATORY MEMBERS

Current Graduate Students

2011– Yilong Zou, BS, Tsinghua University
2012– Danilo Macalinao, BS, Wesleyan University
2013– Yun-Han Huang, BS, MIT

Current Postdoctoral Fellows

2010– Srinivas Malladi, PhD, University of Texas, Austin
2011– Charles David, PhD, Columbia University
2012– Qiong Wang, PhD, University of Rochester Medical Center
2012- Leni Jacob, PhD, University of Texas SW Medical Center
2013– Adrienne Boire, MD, PhD, University of Chicago
2013– Jie Su, PhD, Icahn School of Medicine at Mt Sinai
2013– Emrah Er, PhD, Harvard Medical School
2014- Karuna Ganesh, MA, MB, BCHIR, PhD, University of Cambridge, UK
2014- Ashley McLaughney, PhD, Thayer School of Engineering at Dartmouth College, NH
2016- Jing Hu, PhD, Duke University, Durham, North Carolina

Past Graduate Students

1990–93 Marcus Bosenberg, MD/PhD, Cornell/Sloan Kettering Graduate School
Current position: Associate Professor, Yale University
1992–95 Kornelia Polyak, PhD, Cornell/Sloan Kettering Graduate School
Current position: Professor, Dana-Farber Cancer Institute, Harvard University
1992–96 Frances M.B. Weis, PhD, Cornell/Sloan Kettering Graduate School
Current position: Laboratory Member, Memorial Sloan Kettering Cancer Center
1995–00 Jacqueline Doody, PhD, Hunter College
Current position: Department Head Tumor Immunology, ImClone Systems
1997–00 Roger Lo, MD/PhD, Rockefeller/Cornell/Sloan Kettering
Current position: Associate Professor of Medicine, UCLA
2001–05 Hong-Van Le, PhD, Cornell/Sloan Kettering Graduate School
Current position: Associate, Jones Day Law Firm, New York
2002–06 Gaorav Gupta, MD/PhD, Rockefeller/Cornell/Sloan Kettering
Current position: Assistant Professor, U. North Carolina
2002–08 Claudio Alarcón, PhD, Cornell/Sloan Kettering Graduate School
Current position: Postdoctoral fellow, Rockefeller University
2004–08 David Padua, MD, PhD, Rockefeller Cornell/Sloan Kettering
Current position: Internal Medicine Fellow, UCLA
2004–09 Paula Bos, PhD, Cornell/Sloan Kettering Graduate School
Current position: Postdoctoral Fellow, Memorial Sloan Kettering Cancer Center
2008-14 Xin Jin, PhD, Cornell/Sloan Kettering Graduate School
Current position: Postdoctoral Fellow, Broad Institute of MIT & Harvard

Past Postdoctoral Fellows

1985–88 Ronald A. Ignotz, PhD, University of Pittsburgh
Next position: Assistant Professor, University of Massachusetts Medical School
1985–89 Sela Cheifetz, PhD, University of Toronto
(deceased) Last position: Professor, University of Toronto
1986–89 Joaquin Teixidó, PhD, University of Madrid
Current position: Professor, Consejo Superior de Investigaciones Científicas, Madrid
1986–87 Anna Bassols, PhD, University of Barcelona

Current position: Professor of Biochemistry, University of Barcelona
1986–90 Frederick T. Boyd, PhD, University of Florida
Next position: Assistant Professor, University of Minnesota
1987–91 David Ralph, PhD, Ohio State University
Current position: Management, Integrated Bioscience Solutions LLC
1988–90 Jyrki Heino, MD, PhD, University of Turku, Finland
Current position: Professor, University of Turku, Finland
1988–90 Marikki Laiho, MD, PhD, University of Helsinki, Finland
Current position: Professor, Radiation Oncology, Johns Hopkins School of Medicine
1988–92 Janet Andres, PhD, University of Colorado
Current position: Supervisory Patent Examiner, US Patent and Trademark Office
1989–90 Lars Rönnstrand, PhD, Uppsala University
Current position: Professor, Lunds University, Sweden
1989–92 Carmella Stephens, PhD, State University of New York at Stony Brook
Current position: Counsel, Kenyon & Kenyon Intellectual Property Law
1989–92 Atanasio Pandiella, MD, PhD 1987, University of Santiago, Spain
Current position: Professor, Consejo Superior de Investigaciones Científicas, Salamanca
1990–92 Masahiko Ohtsuki, PhD, University of Tokyo
Current position: Vice President, R&D Planning Department, Daiichi Sankyo, Tokyo
1990–93 Alejandro Zentella, PhD, Rockefeller University
Current position: Professor, Universidad Nacional Autonoma de México
1990–94 Fernando López-Casillas, MD, PhD, Purdue University, Indiana
Current position: Professor, Universidad Nacional Autonoma de México
1990–95 Liliana Attisano, PhD, University of Toronto
Current position: Professor, University of Toronto
1990–95 Jeffrey L. Wrana, PhD, University of Toronto
Current position: Investigator, Samuel Lunenfeld Research Institute, University of Toronto
1991–96 Juan Cárcamo, PhD, University of Medicine and Dentistry of New Jersey
Current position: Senior Scientist, ImClone Systems, New York
1992–95 Diane George, MD, Cornell University Medical College
Current position: Member, Pediatric Oncology & Hematology, Columbia University
1992–95 Rotraud Wieser, PhD, University of Vienna
Current position: Associate Professor of Medicine, University of Vienna, Austria
1993–95 Francesc Ventura, PhD, University of Barcelona
Current position: Professor, University of Barcelona School of Medicine, Spain
1993–96 Joaquin Arribas, PhD, Autonomous University of Madrid
Current position: Investigator, Vall d'Hebron Institute of Oncology, Barcelona
1993–94 Denis Vivien, PhD, University of Paris
Current position: Professor, Université de Caen, France
1993–96 Mong-Hong Lee, PhD, University of Pittsburgh
Current position: Assoc. Professor of Mol. Cell. Oncology, MD Anderson Cancer Center
1993–97 Yan Luo, MD, PhD, Cornell University
Current Position: Medical Director of Oncology, Abbott Laboratories
1993–98 Fang Liu, PhD, Harvard University
Current position: Associate Professor of Chemical Biology, Rutgers University
1994–97 Inga Reynisdóttir, PhD, Columbia University
Current position: Research Scientist, University Hospital, Helsinki
1994–98 Antonio Iavarone, MD, University of Rome
Current position: Associate Professor of Pathology and Neurology, Columbia University
1995–98 Marcus Kretzschmar, PhD, Rockefeller University
Current position: Associate, Finnegan Henderson Law Firm, Washington, DC

1995–00 Akiko Hata, PhD, Rockefeller University
Current position: Professor, Cardiovascular Research Institute, UCSF, San Francisco
1995–02 Stacy Blain, PhD, Columbia University, New York
Current position: Assistant Professor, SUNY Downstate Medical Center, New York
1996–99 Luis Ulloa, PhD, Autonomous University of Madrid
Current position: Associate Professor of Surgery, UMDNJ
1996–99 David Wotton, PhD, University of York
Current position: Assoc. Professor of Biochemistry, University of Virginia, Charlottesville
1996–00 Boris Pasche, MD University of Lausanne, PhD Karolinska Institute
Current position: Director, Division of Hematology/Oncology, University of Alabama
1996–00 Ye-Guang Chen, PhD, Albert Einstein College of Medicine
Current position: Professor, Tsinghua University, Beijing
1997–00 Celio Pouponnot, PhD, Institute Curie, France
Current position: Senior Scientist, CNRS and Institute Curie, Paris
1997–99 Beverly Warner, PhD, W.E. Hall Institute of Medical Research, Melbourne
Next position: Genetic Counselor, Peter MacCallum Cancer Institute, Australia
1997–01 Julia Calonge, PhD, University of Barcelona, Spain
Current position: unknown
1997–01 Lata Jayaraman, PhD, Columbia University, New York
Current position: Senior Research Investigator, Bristol-Myers Squibb Co.
1998–03 Lan Xu, PhD, University of California, San Diego
Current position: Senior Scientist, Blueprint Medicines Inc.
1998–04 Joan Seoane, PhD, University of Barcelona, Spain
Current position: Research Director, Vall Hebron Institute of Oncology, Barcelona
1999–03 Peter Siegel, PhD, McMaster University, Ontario, Canada
Current position: Principal Investigator, Goodman Cancer Res. Centre, McGill University
2000–02 Supratik Das, PhD, Albert Einstein College of Medicine, New York
Next position: Staff scientist, Albert Einstein College of Medicine, New York
2000–03 Chang-Rung Chen, PhD, New York University, New York
Current position: Associate Director, ArQule Inc.
2000–04 Yibin Kang, PhD, Duke University
Current position: Professor, Princeton University, New Jersey
2001–06 Dori Thomas, PhD, Washington University
Next position: Staff Scientist, Hoffmann-La Roche Inc.
2001–07 Wei He, PhD, Baylor College of Medicine, Texas
Current position: Senior Scientist, Abbott Laboratories
2002–04 Nadia Cervoni, PhD, McGill University, Canada
Current position: unknown
2002–05 Andy Minn, MD/PhD, University of Chicago
Current position: Assistant Professor, University of Pennsylvania
2003–06 Roger Gomis, PhD, University of Barcelona
Current position: Assistant Member, Institut de Recerca Biomedica-IRB, Spain
2003–08 Qiongqing Wang, PhD, Albert Einstein College of Medicine, New York
Next position: Staff Scientist, Hoffman-La Roche Inc.
2003–08 Gopal Sapkota, PhD, University of Dundee
Current position: Assistant Professor, University of Dundee, UK
2004–05 Cristina Nadal, MD, PhD, University of Barcelona, Spain
Current position: Member, IDIBAPS Institute, Hospital Clinic, University of Barcelona
2004–07 Dina Marenstein, PhD, NYU Sackler Institute
Current position: Scientific Director, Chameleon Communications International
2004–08 Anne Chiang, MD, PhD, Harvard University and CUMC

Next position: Assistant Professor of Medical Oncology, Yale University

2004–09 Don Nguyen, PhD, University of Rochester
Current position: Assistant Professor of Pathology, Yale University

2006–08 Sohail Tavazoie, MD, PhD, Harvard Medical School
Current position: Assistant Professor, Rockefeller University, New York

2007–09 Sheng Gao, PhD, University of Wisconsin
Current position: Senior Research Biologist, Merck, New Jersey

2007–10 Mi Young Kim, PhD, Cornell University, Ithaca
Current position: Assistant Professor, Korea Advanced Institute of Science & Technology

2007–10 Alexia Zaromytidou, PhD, London Research Institute
Current position: Assistant Editor, Nature Cell Biology

2006–11 Thordur Oskarsson, PhD, ISREC
Current position: Assistant Professor, German Cancer Research Center, Heidelberg

2006–11 Xiang Zhang, PhD, Columbia University, New York
Current position: Assistant Professor, Baylor College of Medicine

2009–12 Alejandro Lopez-Soto, PhD, University of Oviedo, Spain
Current position: pending

2005–13 Qiaoran Xi, PhD, New York University, New York
Current position: Assistant Professor, Tsinghua University, Beijing

2007–13 Swarnali Acharyya, PhD, Ohio State University
Current position: Assistant Professor, Columbia University College Physicians & Surgeons

2008–13 Sakari Vanharanta, MD, PhD, University of Helsinki, Finland
Current position: Group Leader, MRC Research Center, University of Cambridge

2010-14 Manuel Valiente-Cortes, PhD, Institute of Neuroscience, Alicante, Spain
Current position: Group Leader, CNIO, National Cancer Research Center, Spain

2012-15 Leni Jacob, PhD, University of Texas SW Medical Center
Current position: Post Doc Beth Israel Deaconess Medical Center at Harvard University

2007-15 Qing Chen, MD, PhD, U. Med Sciences Beijing; Roswell Park Cancer Institute, NY
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2010-15 Anna Obenauf, PhD, Medical University of Graz, Austria
Current position: Group Leader, (IMP) Institute of Molecular Pathology, Austria