Richard Moriggl

Personal Data:

Place of Birth:	Freilassing, Germany
Date of Birth:	May 17, 1969
Nationality:	German
Acad. Degree:	Univ. Prof. Dr. PhD
Current Position:	Full Professor; University of Veterinary Medicine Vienna, Medical University Vienna, Director Ludwig Boltzmann Institute for Cancer Research, Vienna
Address:	University of Veterinary Medicine Vienna, Veterinärplatz 1, A-1210 Vienna AT; orcid.org/0000-0003-0918-9463 www.vetmeduni.ac.at; www.jak-stat.at; http://lbicr.lbg.ac.at/en; http://www.meduniwien.ac.at/hp/sfb-mpn/

Scientific Education and Career History:

1988 - 1993	Study of Biotechnology at the Technical College, Bingen, Germany and Diploma, Institute of Cell and Molecular Biology, CNRS, Strasbourg, France
1993 - 1997	Doctoral thesis; First at the Friedrich Miescher Institute, Basel, Switzerland, then continuation at Department of Biology, University of Freiburg, Germany
1997 - 2000	Postdoctoral Howard Hughes fellowship at St. Jude Children's Research Hospital, Memphis, USA
2000 – 2002 **2002-2005**	Marie Curie Host Industry Fellowship, Institute of Molecular Pathology Postdoctoral fellow at Institute of Molecular Pathology, Vienna, Austria
since 2005 **since 2013**	Director Ludwig Boltzmann Institute for Cancer Research, Vienna LBI-CR Renewal and second funding period with five Partner Institutes
since 2014	Functional Cancer Genomics (C4 / full professorship), Institute of Animal Breeding and Genetics, University of Veterinary Medicine Vienna, Medical University Vienna

Fellowships, Awards and Appointments:

1992	"Max Buchner-Forschungspreis", DECHEMA
1997 - 2000	Howard Hughes Medical Institute Postdoctoral Fellowship
2000 - 2002	Marie Curie Host Industry Fellowship
2003	"Habilitation/*Venia Docendi"* for Molecular Biology, Medical University Vienna
2005	Offered group leader position, Leibniz Institute for Age Research, Jena
2005	Director Ludwig Boltzmann Institute for Cancer Research
2014	Endowed Prof. with the two medical universities Vienna for Functional Cancer Genomics

Personal Statement

The JAK-STAT pathway is a central cancer pathway that can drive other essential core cancer pathways such as survival, cell cycle progression, PI3K-AKT-mTOR signalling or angiogenesis. However, it can also promote differentiation and senescence, or it is involved in stem cell renewal and cycling. Furthermore, chronic inflammatory conditions due to cytokine action use the JAK-STAT pathway. The JAK-STAT field moved into targeted drugs for JAK kinases and STAT transcription factors where we are actively participate through collaborative work with international groups. Our long term mission is to explore new therapies in transgenic mouse models based on patient findings for gain or loss of function JAK-STAT mutation providing new concepts for targeted therapy.

Career-related Activities:
Accepted voluntary reviewer function for (in alphabetic order): *Bioconjugate Chemistry*, *Blood*, *British Journal of Cancer*, *Cancer Discovery*, *Cancer Research*, *Carcinogenesis*, *Cell Reports*, *EMBO Journal*, *EMBO Molecular Medicine*, *EMBO Reports*, *European Journal of Clinical Investigation*, *Journal of Clinical Investigation*, *Journal of Immunology*, *Expert Review of Molecular Diagnostics*, *Expert Review of Endocrinology and Metabolism*, *FEBS Letters*, *Future Drugs Ltd.*, *Gut*, *International Journal of Molecular Sciences*, *JAK-STAT*, *Journal of Biological Chemistry*, *Journal of Leukocyte Biology*, *Haematologica*, *Hepatology*, *Human Molecular Genetics*, *Leukaemia*, *Molecular and Cellular Biology*, *Molecular and Cellular Endocrinology*, *Molecular Oncology*, *Oncotarget*, *Proceedings of the National Academy of Science USA*, *PLOS One*, *Swiss Medical Weekly*, *The Scientific World Journal* and others. Editorial Board Member for *JAK-STAT*; External review on multiple NIH applications, advisory reviewer for the "Institute National Du Cancer" (France), multiple reviews for the French National Research Agency (ANR), France, several reviews for the Croatian Science Foundation, the Liddy Shriver Sarcoma Initiative (USA), the University Hospitals Case Medical Centre (USA), the German Research Foundations “Deutsche Forschungsgemeinschaft” or “Deutsche Krebshilfe” (Germany), the Heinrich Heine University (Düsseldorf, Germany), Health Research Council of New Zealand, the Paracelsus Medical University Salzburg (Austria), the "Volkswagenstiftung" (Germany), the “NÖ Forschungs- und Bildungsges.m.b.H.” (Austria), the University Montreal (Canada), the Académie Louvain (Belgium), evaluator for the Molecular and Cellular Medicine Board, Medical Research Council MRC and for the Wellcome Trust, both United Kingdom, Basic Science Fund, Denmark, external evaluator on Institute Cochin, the Hospital Necker, both Paris, France, under guidance of AERES, two rounds scientific evaluation committee member for the TRANSCAN ERA-Net on Translational Cancer Research, scientific evaluation committee member for the FCT Scientific Research and Technological Development Projects – 2015 from the Ministry of Science and Education, Portugal

Research Interest:

- JAK-STAT signaling and core cancer pathways
- Basic and translational cancer research with a main focus on the generation and utilization of gene targeted mouse models to explore new therapies; comparative cancer pathology
- JAK-STAT in leukaemia, lymphoma, melanoma, Ewing sarcoma, liver, colorectal, prostate, breast and lung cancer, metabolic control through GR and STAT5 transcription factors

Publications:

Original papers: >115; Peer-reviewed reviews & Book Chapters: 15; Invited lectures: >200; Patent involvements: 2

Citation Report based on Google Scholar:

h-index:	**44**
i10-index	**84**
total citations:	**7332**

Major Recent Research Grants:

1. Basic Funding of the LBI-CR: Ludwig Boltzmann Society (LGB) and five Partner organisations (Medical University Vienna, Institute of Molecular Pathology, Children´s

Cancer Research Center, Tissue Gnostics, Vetenarian University Vienna), 2005-2019, http://lbicr.lbg.ac.at/en; (~1.2 Mill €/year)

2. Austrian Science Funds: FWF-SFB F28-B13, 2006-2016, Special research programme 'Jak-Stat Signaling: From Basics to Disease; www.jak-stat.at; Subproject (~130 k*€/year*)
3. Austrian Science Funds: FWF-SFB F28-B13, 2006-2016, Special research programme 'Jak-Stat Signaling: From Basics to Disease; www.meduniwien.ac.at/sfb_mpn; Deputy coordinator and subproject (~100 k*€/year*)
4. Melanoma grant, 2008-2016, International donation for melanoma research, (~120 k*€/year*)
5. National Institutes of Health, 2013-2015, NIAID R21AI103388-01, Co-applicant with 10% contribution to Dr. X. Han, Children´s Research Hospital, Cincinnati (~10 k€)

Publications (last five years):

1. Park, J., Kim, S., Joh, J., Remick, S.C., Miller, D.M., Yan, J., Kanaan Z., Chao, J.H., Krem, M.M., Basu, S.K., Hagiwara, S., Kenner, L., Moriggl, R., Bunting, K.D. & Tse, W. MLLT11/AF1q boosts oncogenic STAT3 activity through Src-PDGFR tyrosine kinase signalling. **Oncotarget**, *in press*, doi: 10.18632/oncotarget.9759
2. Minas, T.Z., Surdez, D., Javaheri, T., Tanaka, M., Howarth, M., Kang, H.J., Han, J., Han, Z.H., Sax, B., Kream, B.E., Hong, S.H., Celik, H., Tirode, F., Tuckermann, J., Toretsky, J.A., Kenner, L., Kovar, H., Lee, S.*, Sweet-Cordero, E.A.*, Nakamura, T.* Moriggl, R.*, Delattre, O*. & Üren A*. Combined experience of six independent laboratories attempting to create an Ewing sarcoma model. **Oncotarget**, *in press*, doi: 10.18632/oncotarget.9388; *equal correspondence
3. Nivarthi, H., Gordziel, C., Themanns, M., Kramer, N., Eberl, M., Rabe, B., Schlederer, M., Rose-John, S., Knösel, T., Kenner, L., Freund, P., Aberger, F., Han, X., Kralovics, R., Dolznig, H., Jennek, S., Friedrich, K. & Moriggl, R. The ratio of STAT1 and STAT3 expression is a determinant of colorectal cancer growth. **Oncotarget**, *in press*, doi: 10.18632/oncotarget.9315
4. Bauer, E., Schlederer, M., Scheicher, R., Horvath, J., Aigner, P., Schiefer, A.I., Kain, R., Regele, H., Hoermann, G., Steiner, G., Kenner, L., Sexl, V., Villunger, A., Moriggl, R. & Stoiber, D. Cooperation of ETV6/RUNX1 and BCL2 enhances immunoglobulin production and accelerates glomerulonephritis in transgenic mice. **Oncotarget**, 15, 12191-12205. doi: 10.18632/oncotarget.7687
5. Gotthardt, D., Putz, E.M., Grundschober, E., Prchal-Murphy, M., Straka, E., Kudweis, P., Heller, G., Bago-Horvath, Z., Witalisz-Siepracka, A., Cumaraswamy, A.A., Gunning, P.T., Strobl, B., Muller, M., Moriggl, R., Stockmann, C. & Sexl, V. STAT5 is a key regulator of NK cells and acts as molecular switch from tumor surveillance to tumor promotion. **Cancer Discov***,* 6, 414-429. doi: 10.1158/2159-8290.CD-15-0732
6. Kovar, H., Amatruda, J., Brunet, E., Burdach, S., Cidre-Aranaz, F., de Alava, E., Dirksen, U., van der Ent, W., Grohar, P., Grünewald, T.G., Helman, L., Houghton, P., Iljin, K., Korsching, E., Ladanyi, M., Lawlor, E., Lessnick, S., Ludwig, J., Meltzer, P., Metzler, M., Mora, J., Moriggl, R., Nakamura, T., Papamarkou, T., Sarikas, B.R., Rédini, F., Richter, G.H., Rossig, C., Schadler, K., Schäfer, B.W., Scotlandi, K., Sheffield, N.C., Shelat, A., Snaar-Jagalska, E., Sorensen, P., Stegmaier, K., Stewart, E., Sweet-Cordero, A., Szuhai, K., Tirado, O.M., Tirode, F., Toretsky, J., Tsafou, K., Üren, A., Zinovyev, A., Delattre, O. (2016) The second European interdisciplinary Ewing sarcoma research summit – A joint effort to deconstructing the multiple layers of a complex disease. **Oncotarget***,* 7, 8613-8624. doi: 10.18632/oncotarget.6937
7. Birner, P., Heider, S., Petzelbauer, P., Wolf, P., Kornauth, C., Kuroll, M., Merkel, O., Steiner, G., Kishimoto, T., Rose-John, S., Soleiman, A., Moriggl, R. & Kenner, L. (2016) Interleukin-6 receptor alpha blockade improves skin lesions in a murine model of systemic lupus erythematosus. **Exp Pathol***,* 25, 305-310. doi: 10.1111/exd.12934
8. Lin, Q., Chauvistré, H., Costa, I.G., Gusamo, E. G., Mitzka, S., Hänzelmann, S., Baying, B., Klisch, T., Moriggl, R., Hennuy, B., Smeets, H., Hoffmann, K., Benes, V., Seré, K. & Zenke, M. (2016) Epigenetic program and transcription factor circuitry of dendritic cell development. **Nucleic Acid Research** 43, 9680-93. doi: 10.1093/nar.gkv1056
9. Minas, T.Z., Han, J., Javaheri, T., Hong, S.H., Schlederer, M., Saygideger-Kont, Y., Celik, H., Mueller, K.M., Temel, I., Özdemirli, M., Kovar, H., Erkizan, H.V., Toretsky, J., Kenner, L., Moriggl, R. & Üren, A. (2015) YK-4-279 effectively antagonizes EWS-FLI1 induced leukemia in a transgenic mouse model. **Oncotarget***,* 6, 37678-94. doi: 10.18632/oncotarget.5520
10. Eiring, A. M., Page, B. D., Kraft, I. L., Mason, C. C., Vellore, N. A., Resetca, D., Zabriskie, M. S., Zhang, T. Y., Khorashad, J. S., Engar, A. J., Reynolds, K. R., Anderson, D. J., Senina, A., Pomicter, A. D., Arpin, C. C., Ahmad, S., Heaton, W. L., Tantravahi, S. K., Todic, A., Colaguori, R., Moriggl, R., Wilson, D. J., Baron, R., O'Hare, T., Gunning, P. T., and Deininger, M. W. (2015). Combined STAT3 and BCR-ABL1 inhibition induces synthetic lethality in therapy-resistant chronic myeloid leukemia. **Leukemia***,* 29, 586-597. doi: 10.1038/leu.2014.245
11. Gilbert, S., Nivarthi, H., Mayhew, C. N., Lo, Y. H., Noah, T. K., Vallance, J., Rulicke, T., Muller, M., Jegga, A. G., Tang, W., Zhang, D., Helmrath, M., Shroyer, N., Moriggl, R., and Han, X. (2015). Activated STAT5 confers resistance to intestinal injury by increasing intestinal stem cell proliferation and regeneration. **Stem Cell Reports***,* 4, 209-225. doi: 10.1016/j.stemcr.2014.12.004

12. Girardot, M., Pecquet, C., Chachoua, I., Van Hees, J., Guibert, S., Ferrant, A., Knoops, L., Baxter, E. J., Beer, P. A., Giraudier, S., Moriggl, R., Vainchenker, W., Green, A. R., and Constantinescu, S. N. (2015). Persistent STAT5 activation in myeloid neoplasms recruits p53 into gene regulation. **Oncogene**, 34, 1323-1332. doi: 10.1038/onc.2014.60
13. Grabner, B., Schramek, D., Mueller, K. M., Moll, H. P., Svinka, J., Hoffmann, T., Bauer, E., Blaas, L., Hruschka, N., Zboray, K., Stiedl, P., Nivarthi, H., Bogner, E., Gruber, W., Mohr, T., Zwick, R. H., Kenner, L., Poli, V., Aberger, F., Stoiber, D., Egger, G., Esterbauer, H., Zuber, J., Moriggl, R., Eferl, R., Gyorffy, B., Penninger, J. M., Popper, H., and Casanova, E. (2015). Disruption of STAT3 signalling promotes KRAS-induced lung tumorigenesis. **Nat Commun**, 6, 6285. doi: 10.1038/ncomms7285
14. Jayavelu, A. K., Muller, J. P., Bauer, R., Bohmer, S. A., Lassig, J., Cerny-Reiterer, S., Sperr, W. R., Valent, P., Maurer, B., Moriggl, R., Schroder, K., Shah, A. M., Fischer, M., Scholl, S., Barth, J., Oellerich, T., Berg, T., Serve, H., Frey, S., Fischer, T., Heidel, F. H., and Bohmer, F. D. (2015). NOX4-driven ROS formation mediates PTP inactivation and cell transformation in FLT3ITD positive AML cells. **Leukemia**. doi: 10.1038/leu.2015.234
15. Merkel, O., Hamacher, F., Griessl, R., Grabner, L., Schiefer, A. I., Prutsch, N., Baer, C., Egger, G., Schlederer, M., Krenn, P. W., Hartmann, T. N., Simonitsch-Klupp, I., Plass, C., Staber, P. B., Moriggl, R., Turner, S. D., Greil, R., and Kenner, L. (2015). Oncogenic role of miR-155 in anaplastic large cell lymphoma lacking the t(2;5) translocation. **J Pathol**, 236, 445-456. doi: 10.1002/path.4539
16. Nivarthi, H., Prchal-Murphy, M., Swoboda, A., Hager, M., Schlederer, M., Kenner, L., Tuckermann, J., Sexl, V., Moriggl, R., and Ermakova, O. (2015). Stat5 gene dosage in T cells modulates CD8+ T-cell homeostasis and attenuates contact hypersensitivity response in mice. **Allergy**, 70, 67-79. doi: 10.1111/all.12535
17. Park, J., Schlederer, M., Schreiber, M., Ice, R., Merkel, O., Bilban, M., Hofbauer, S., Kim, S., Addison, J., Zou, J., Ji, C., Bunting, S. T., Wang, Z., Shoham, M., Huang, G., Bago-Horvath, Z., Gibson, L. F., Rojanasakul, Y., Remick, S., Ivanov, A., Pugacheva, E., Bunting, K. D., Moriggl, R., Kenner, L., and Tse, W. (2015). AF1q is a novel TCF7 co-factor which activates CD44 and promotes breast cancer metastasis. **Oncotarget**, 6, 20697-20710.
18. Pencik, J., Schlederer, M., Gruber, W., Unger, C., Walker, S. M., Chalaris, A., Marie, I. J., Hassler, M. R., Javaheri, T., Aksoy, O., Blayney, J. K., Prutsch, N., Skucha, A., Herac, M., Kramer, O. H., Mazal, P., Grebien, F., Egger, G., Poli, V., Mikulits, W., Eferl, R., Esterbauer, H., Kennedy, R., Fend, F., Scharpf, M., Braun, M., Perner, S., Levy, D. E., Malcolm, T., Turner, S. D., Haitel, A., Susani, M., Moazzami, A., Rose-John, S., Aberger, F., Merkel, O., Moriggl, R., Culig, Z., Dolznig, H., and Kenner, L. (2015). STAT3 regulated ARF expression suppresses prostate cancer metastasis. **Nat Commun**, 6, 7736. doi: 10.1038/ncomms8736
19. Rupp, C., Scherzer, M., Rudisch, A., Unger, C., Haslinger, C., Schweifer, N., Artaker, M., Nivarthi, H., Moriggl, R., Hengstschlager, M., Kerjaschki, D., Sommergruber, W., Dolznig, H., and Garin-Chesa, P. (2015). IGFBP7, a novel tumor stroma marker, with growth-promoting effects in colon cancer through a paracrine tumor-stroma interaction. **Oncogene**, 34, 815-825. doi: 10.1038/onc.2014.18
20. Schutz, A., Roser, K., Klitzsch, J., Lieder, F., Aberger, F., Gruber, W., Mueller, K. M., Pupyshev, A., Moriggl, R., and Friedrich, K. (2015). Lung Adenocarcinomas and Lung Cancer Cell Lines Show Association of MMP-1 Expression With STAT3 Activation. **Transl Oncol**, 8, 97-105. doi: 10.1016/j.tranon.2015.02.002
21. Weber, A., Borghouts, C., Brendel, C., Moriggl, R., Delis, N., Brill, B., Vafaizadeh, V., and Groner, B. (2015). Stat5 Exerts Distinct, Vital Functions in the Cytoplasm and Nucleus of Bcr-Abl+ K562 and Jak2(V617F)+ HEL Leukemia Cells. **Cancers (Basel)**, 7, 503-537. doi: 10.3390/cancers7010503
22. Zhang, R., Gilbert, S., Yao, X., Vallance, J., Steinbrecher, K., Moriggl, R., Zhang, D., Eluri, M., Chen, H., Cao, H., Shroyer, N., Denson, L., and Han, X. (2015). Natural compound methyl protodioscin protects against intestinal inflammation through modulation of intestinal immune responses. **Pharmacol Res Perspect**, 3, e00118. doi: 10.1002/prp2.118
23. Berger, A., Hoelbl-Kovacic, A., Bourgeais, J., Hoefling, L., Warsch, W., Grundschober, E., Uras, I. Z., Menzl, I., Putz, E. M., Hoermann, G., Schuster, C., Fajmann, S., Leitner, E., Kubicek, S., Moriggl, R., Gouilleux, F., and Sexl, V. (2014). PAK-dependent STAT5 serine phosphorylation is required for BCR-ABL-induced leukemogenesis. **Leukemia**, 28, 629-641. doi: 10.1038/leu.2013.351
24. Berger, A., Sexl, V., Valent, P., and Moriggl, R. (2014). Inhibition of STAT5: a therapeutic option in BCR-ABL1-driven leukemia. **Oncotarget**, 5, 9564-9576.
25. Bibi, S., Arslanhan, M. D., Langenfeld, F., Jeanningros, S., Cerny-Reiterer, S., Hadzijusufovic, E., Tchertanov, L., Moriggl, R., Valent, P., and Arock, M. (2014). Co-operating STAT5 and AKT signaling pathways in chronic myeloid leukemia and mastocytosis: possible new targets of therapy. **Haematologica**, 99, 417-429. doi: 10.3324/haematol.2013.098442
26. Muller, S., Chen, Y., Ginter, T., Schafer, C., Buchwald, M., Schmitz, L. M., Klitzsch, J., Schutz, A., Haitel, A., Schmid, K., Moriggl, R., Kenner, L., Friedrich, K., Haan, C., Petersen, I., Heinzel, T., and Kramer, O. H. (2014). SIAH2 antagonizes TYK2-STAT3 signaling in lung carcinoma cells. **Oncotarget**, 5, 3184-3196.
27. Rumi, E., Harutyunyan, A. S., Casetti, I., Pietra, D., Nivarthi, H., Moriggl, R., Cleary, C., Bagienski, K., Astori, C., Bellini, M., Berg, T., Passamonti, F., Kralovics, R., and Cazzola, M. (2014). A novel germline JAK2 mutation in familial myeloproliferative neoplasms. **Am J Hematol**, 89, 117-118. doi: 10.1002/ajh.23614
28. Schlederer, M., Mueller, K. M., Haybaeck, J., Heider, S., Huttary, N., Rosner, M., Hengstschlager, M., Moriggl, R., Dolznig, H., and Kenner, L. (2014). Reliable quantification of protein expression and cellular localization in histological sections. **PLoS One**, 9, e100822. doi: 10.1371/journal.pone.0100822
29. Strobl, B., and Moriggl, R. (2014). Recovery from chemotherapy depends on STAT1 for replenishment of B lymphopoiesis. **J Leukoc Biol**, 95, 849-851. doi: 10.1189/jlb.0114051

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31. Gordziel, C., Bratsch, J., Moriggl, R., Knosel, T., and Friedrich, K. (2013). Both STAT1 and STAT3 are favourable prognostic determinants in colorectal carcinoma. **Br J Cancer**, 109, 138-146. doi: 10.1038/bjc.2013.274
32. Kollmann, K., Heller, G., Schneckenleithner, C., Warsch, W., Scheicher, R., Ott, R. G., Schafer, M., Fajmann, S., Schlederer, M., Schiefer, A. I., Reichart, U., Mayerhofer, M., Hoeller, C., Zochbauer-Muller, S., Kerjaschki, D., Bock, C., Kenner, L., Hoefler, G., Freissmuth, M., Green, A. R., Moriggl, R., Busslinger, M., Malumbres, M., and Sexl, V. (2013). A kinase-independent function of CDK6 links the cell cycle to tumor angiogenesis. **Cancer Cell**, 24, 167-181. doi: 10.1016/j.ccr.2013.07.012
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