## Curriculum Vitae


### Name & Address

**Seiser Christian –** *Associate Professor for Molecular Biology*

*Current Position: Group Leader Center for Anatomy and Cell Biology*

Medical University Vienna, Center for Anatomy and Cell Biology,

Division of Cell and Developmental Biology, Schwarzspanierstrasse 17, 1090 Vienna, Austria

Phone: +43-1-40160 37507;

e-mail: christian.seiser@univie.ac.at ORCID: 0000-0002-7046-9352

Web:http://anatomieundzellbiologie.meduniwien.ac.at/zellbiologie/epigenetics-and-rna-biology/group-seiser/


### Main Research Interests

My laboratory has a long-standing interest in the function of mammalian chromatin modifiers in particular in the class I deacetylases HDAC1 and HDAC2. We have initially identified HDAC1 as a growth factor inducible gene in T cells. We have characterized the transcriptional co-repressor function of HDAC1 and have discovered that the transcription factor SP1 and the estrogen receptor associated factor REA can negatively modulate transcription by recruiting HDAC1 to target genes. In 2002 we have published the first histone deacetylase knockout in mice and have shown that HDAC1 is essential for embryonic development and unrestricted proliferation of embryonic stem cells. During the last years, we have used transgenic mouse models to study the roles of HDAC1 and HDAC2 in the control of cellular homeostasis. We have revealed the regulatory function of HDAC1 in teratomas and T cells and have identified specific and overlapping roles of HDAC1 and its closest homolog HDAC2 in epidermal homeostasis, skin tumorigenesis, and brain development. To understand the regulatory functions of the two deacetylases and other chromatin modifiers in gene regulation, proliferation, differentiation and development we have established knock-out and knock-in mouse models, molecular genetics tools and chromatin-related methods such as ChIP-seq and have generated specific antibodies for enzymes, histone modifications and readers of histone modifications.

### Scientific Education and Career History

| | |
|---|---|
| 2016 - date | Associate Professor, CACB, Medical University of Vienna |
| 1998 – 2016 | Associate Professor, Max F. Perutz Laboratories, Medical University of Vienna |
| 1998 | Venia legendi in Molecular Biology, University of Vienna, Medical School |
| 1992 – 1998 | Group Leader and Assistant professor, Institute of Molecular Biology, University of Vienna |
| 1989 – 1992 | Postdoctoral Fellow in Lukas Kühn's laboratory, ISREC, Epalinges sur Lausanne, Switzerland |
| 1986 – 1989 | PhD studies (Molecular Biology), Institute of Molecular Biology, University of Vienna, with distinction |
| 1985 – 1986 | Diploma thesis at the Institute for Biochemistry, University of Vienna |
| 1981 – 1985 | Studies in Biochemistry, University of Vienna, with distinction |
| 1977 – 1981 | Studies in Chemistry, Physics, Mathematics, University of Vienna |

### Experience in Scientific Management, Teaching and Student Supervision

| | |
|---|---|
| Since 1992 | Supervision of 43 theses (19 PhD, 30 Diploma/Master) |
| 1998 - 2003 | more than 500 exams in Chemistry and Biochemistry, University of Vienna Medical School |
| 2000 - 2002 | Contribution to planning of the New Medical Curriculum, (Medical) University of Vienna |
| 2000 - present | Teaching > 100 academic hours per semester at the Medical University and the |

## Supervision of Doctoral (PhD) Thesis Students (past five years – 18 since 1993)

**Mircea Winter –**PhD Student 2008-2012
"The role of the epigenetic regulators HDAC1, HDAC2 and DNMT1 in mouse epidermis development and tumorigenesis", 2 publications
**Anna Sawicka -** PhD Student 2009 – 2014
"Genome-wide analysis of stress-induced histone H3 phosphorylation", 9 publications
**Astrid Hagelkruys –**PhD Student 2009 – 2013
"Redundant and specific functions of histone deacetylases HDAC1 and HDAC2 in brain development", 8 publications
**Mirjam A. Moser –**PhD Student 2011 – 2015
"Chromatin modifiers as regulators of mouse epidermal development and tumorigenesis", 6 publications
**Lena Hess –**PhD Student 2017 - ongoing
"Dissection of catalytic and non-catalytic functions of HDAC1 and HDAC2"

## Invited Conference Presentations

- *2013* - Talk at the FASEB Conference *HDACs, Sirtuins and reversible Acetylation in Signaling and Disease*. Lucca Italy
- *2009* - Talk at the FASEB Conference *Histone deacetylases and reversible Acetylation in Signaling and Disease*. Lucca Italy
- *2007* - Talk at the FASEB Conference *Histone deacetylases*. Snowmass Village, Colorado, USA.

## Memberships in Reviewing Panels, Editorial Boards, Scientific Organizations

- 2011 - Co-editor together with P. Matthias and M. Yoshida Special Issue "Protein Acetylation and the Physiological Role of HDACs" Journal of Biomedicine and Biotechnology
- Peer reviewer for funding agencies including Wellcome Trust (UK)
- Peer reviewer for > 10 journals

## Most Important Research Funding (selection of most relevant in past 5 years)

Since 1995 I have received peer-reviewed funding from the Austrian Science Fund (FWF) (10 stand-alone projects), the Austrian Research Promotion Agency (FFG), the Vienna Science and Technology Fund (WWTF) and the Austrian Federal Ministry for Education, Science, and Culture (3 GEN-AU projects).

- 2016 - 2019, FWF – HDAC1/HDAC2 as regulators of tumorigenesis - 350 k€
- 2016 - 2018, FWF – Enzymatic and non-enzymatic functions of HDAC1/HDAC2 – 349 k€
- 2016 - 2019, FFG - Mimicking isoform-specific HDAC inhibitors - 390 k€
- 2009 - 2013, WWTF - Epigenetic Regulation of T Cell Development and Function - collaborative grant with Wilfried Ellmeier, Medical University of Vienna – part of C.S.- 250 k€
- 2004 - 2013, GEN-AU - Epigenetic Plasticity of the Mammalian Genome" parts I-III, - 1058 k€

## Key International Collaborators

- **Patrick Matthias**, F. Miescher Inst. for Biomed Research, Basel, SE patrick.matthias@fmi.ch
- **Susanna Chiocca**, FOM-IEO, Milan, Italy susanna.chiocca@ifom-ieo-campus.it
- **James R. Davie**, University of Manitoba, Winnipeg, CA Jim.Davie@umanitoba.ca
- **Srividya Bhaskara**, University of Utah, USA Srividya.Bhaskara@hci.utah.edu

## List of Publications (2012 - 2016)

Overall, **78** publications with a cumulative IF of **453**. Based on Google Scholar**,** the publications received more than **5800** citations with a current life-time Hirsch **h Index** of **37.**

*1.* Hagelkruys A, Mattes K, Moos V, Rennmayr M, Ringbauer M, Sawicka A, and **Seiser C** (2016) Essential non-redundant function of the catalytic activity of HDAC2 in mouse development. **Mol. Cell. Biol.** 36:462-74

*2.* Loponte S, Segré CV, Senese S, Miccolo C, Santaguida S, Deflorian G, Citro S, Mattoscio D, Pisati F, Moser MA, Visintin R, **Seiser C**, Chiocca S (2016) Dynamic phosphorylation of Histone Deacetylase 1 by Aurora kinases during mitosis regulates zebrafish embryos development. **Sci Rep**. 6:30213.

*3.* Segré CV, Senese S, Loponte S, Santaguida S, Soffientini P, Grigorean G, Cinquanta M, Ossolengo G, **Seiser C**, Chiocca S (2016) A monoclonal antibody specific for prophase phosphorylation of histone deacetylase 1: a readout for early mitotic cells **MAbs**. 8:37-42

*4.* Sakaguchi S, Hombauer M, Hassan H, Tanaka H, Yasmin N, Naoe Y, Bilic I, Moser MA, Hainberger D, Mayer H, **Seiser C**, Bergthaler A, Taniuchi I, Ellmeier W (2015) A novel Cd8-cis-regulatory element preferentially directs expression in CD44hiCD62L+ CD8+ T cells and in CD8alphaalpha+ dendritic cells. **J. Leukoc. Biol.** 97:635-644

*5.* Tschismarov R, Firner S, Gil-Cruz C, Göschl L, Boucheron N, Steiner G, Matthias P, **Seiser C**, Ludewig B, Ellmeier W (2014) HDAC1 controls CD8+ T cell homeostasis and antiviral response. **PloS one** 9, e110576

*6.* Sawicka A, Hartl D, Goiser M, Pusch O, Stocsits RR, Tamir IM, Mechtler K, **Seiser C** (2014) H3S28 phosphorylation is a hallmark of the transcriptional response to cellular stress. **Genome Res.** 24, 1808-1820 Faculty of 1000 prime recommended

*7.* Hagelkruys A, Lagger S, Krahmer J, Leopoldi A, Artaker M, Pusch O, Zezula J, Weissmann S, Xie Y, Schofer C, Schlederer M, Brosch G, Matthias P, Selfridge J, Lassmann H, Knoblich JA, **Seiser C**, (2014) A single allele of Hdac2 but not Hdac1 is sufficient for normal mouse brain development in the absence of its paralog. **Development** 141:604-616

*8.* Boucheron N, Tschismarov R, Göschl L, Moser MA, Lagger S, Sakaguchi S, Winter M, Lenz F, Vitko D, Breitwieser FP, Muller L, Hassan H, Bennett KL, Colinge J, Schreiner W, Egawa T, Taniuchi I, Matthias P, **Seiser C***, Ellmeier W* (2014) CD4(+) T cell lineage integrity is controlled by the histone deacetylases HDAC1 and HDAC2. **Nat. Immunol**. 15, 439-448 (2014) (*C.S. + W.E. are co-senior authors)

*9.* Winter M, Moser M.A., Meunier D, Fischer C, Machat G. Mattes K, Lichtenberger BM, Brunmeir R, Weissmann S, Murko C, Humer C, Meischel T, Brosch G, Matthias P, Sibilia M, **Seiser C** (2013) Divergent roles of HDAC1 and HDAC2 in the regulation of epidermal development and tumorigenesis. **EMBO J**. 32, 3176-3191

*10.* Murk, C, Lagger S, Steiner M, **Seiser C**, Schoefer C, Pusch O (2013) Histone deacetylase inhibitor Trichostatin A induces neural tube defects and promotes neural crest specification in the chicken neural tube. **Differentiation** 85, 55-66

*11.* Citro S, Ellis J, Hay RT, **Seiser C**, Chiocca S (2013) A role for paralog-specific sumoylation in histone deacetylase 1 stability **J. Mol. Cell. Biol**. 5:416-27

*12.* Khan DH, He S, Yu J, Winter S, Cao W, **Seiser C**, Davie JR. (2013) Protein kinase CK2 regulates the dimerization of histone deacetylase 1 (HDAC1) and HDAC2 during mitosis. **J Biol Chem** 288:16518-28.

*13.* He S, Khan DH, Winter S, **Seiser C**, Davie JR. (2013) Dynamic distribution of HDAC1 and HDAC2 during mitosis: Association with F-actin.**J Cell Physiol**. 228(7):1525-35

*14.* Hoebaus, J, Heher, P, Gottschamel, T, Scheinast, M, Auner, H, Walder, D, Wiedner, M, Taubenschmid, J, Miksch, M, Sauer, T, Schultheis, M; Kuzmenkin, A, **Seiser, C**, Hescheler, J, Weitzer, G (2013). Embryonic Stem Cells Facilitate the Isolation of Persistent Clonal

Cardiovascular Progenitor Cell Lines and Leukemia Inhibitor Factor Maintains Their Self-Renewal and Myocardial Differentiation Potential in vitro. **Cells Tissues Organs** 197:249-68

*15.* Murko, C, Lagger, S, Steiner, M, **Seiser, C**, Schoefer, C, Pusch, O (2013). Histone deacetylase inhibitor Trichostatin A induces neural tube defects and promotes neural crest specification in the chicken neural tube. **Differentiation** 85:55-66

*16.* Fonseca JP, Steffen PA, Müller S, Lu J, Sawicka A, **Seiser C**, Ringrose L.(2012). In vivo Polycomb kinetics and mitotic chromatin binding distinguish stem cells from differentiated cells. **Genes Dev**. 2012 26:857-71

*17.* Koerner MV, Pauler FM, Hudson QJ, Santoro F, Sawicka A, Guenzl PM, Stricker SH, Schichl YM, Latos PA, Klement RM, Warczok KE, Wojciechowski J, **Seiser C**, Kralovics R, Barlow DP (2012) A Downstream CpG Island Controls Transcript Initiation and Elongation and the Methylation State of the Imprinted Airn Macro ncRNA Promoter. **PLoS Genet**. 8:e100254

*18.* Jurkin J, Zupkovitz G, Lagger S, Grausenburger R, Hagelkruys A, Kenner L, and **Seiser C** (2011) Distinct and redundant functions of histone deacetylases HDAC1 and HDAC2 in proliferation and tumorigenesis. **Cell Cycle** 10:406-12

## Review Articles

*1.* Moser MA, Hagelkruys A, **Seiser C** (2014) Transcription and beyond: the role of mammalian class I lysine deacetylases. **Chromosoma** 123, 67-78 (2014)

*2.* Sawicka A, **Seiser C** (2014) Sensing core histone phosphorylation - a matter of perfect timing. **Biochim. Biophys. Acta** 1839:711-718

*3.* Sawicka A and **Seiser C** (2012) Histone H3 phosphorylation - A versatile chromatin modification for different occasions. **Biochimie**. 94:2193-201

*4.* Hagelkruys A, Sawicka A, Rennmayr M, **Seiser C** (2011) The biology of HDAC in cancer: the nuclear and epigenetic components. **Handb Exp Pharmacol**. 206:13-37

***Book Chapter***

Hagelkruys A, Moser MA, **Seiser C** (2017) Generation of Tissue-Specific Mouse Models to Analyze HDAC Functions. **Methods Mol Biol**. **1510**:169-192.

## 10 Most Important Career Publications

*1.* Lagger G, O'Carroll D, Rembold M, Khier H, Weitzer G, Tischler J, Jenuwein T, **Seiser C** (2002) Essential function of histone deacetylase 1 in proliferation control and CDK inhibitor repression. **EMBO J**. 21:2672-2681 (more than 600 citations)

*2.* Winter M, Moser M.A. Meunier D, Fischer C, Machat G. Mattes K, Lichtenberger BM, Brunmeir R, Weissmann S, Murko C, Humer C, Meischel T, Brosch G, Matthias P, Sibilia M, **Seiser C** (2013) Divergent roles of HDAC1 and HDAC2 in the regulation of epidermal development and tumorigenesis. **EMBO J**. 32, 3176-3191

*3.* Hagelkruys A, Lagger S, Krahmer J, Leopoldi A, Artaker M, Pusch O, Zezula J, Weissmann S, Xie Y, Schofer C, Schlederer M, Brosch G, Matthias P, Selfridge J, Lassmann H, Knoblich JA, **Seiser C**, (2014) A single allele of Hdac2 but not Hdac1 is sufficient for normal mouse brain development in the absence of its paralog. **Development** 141:604-616

*4.* Boucheron N, Tschismarov R, Göschl L, Moser MA, Lagger S, Sakaguchi S, Winter M, Lenz F, Vitko D, Breitwieser FP, Muller L, Hassan H, Bennett KL, Colinge J, Schreiner W, Egawa T, Taniuchi I, Matthias P, **Seiser C***, Ellmeier W* (2014) CD4(+) T cell lineage integrity is controlled by the histone deacetylases HDAC1 and HDAC2. **Nat. Immunol**. 15, 439-448 (2014) (*C.S. + W.E. are co-senior authors)

*5.* Bartl S, Taplick J, Lagger G, Khier H, Kuchler K, **Seiser C** (1997) Identification of mouse histone deacetylase 1 as a growth factor-inducible gene. **Mol. Cell. Biol**. 17:5033-5043

*6.* Doetzlhofer A, Rotheneder H, Lagger G, Koranda M, Kurtev V, Brosch G, Wintersberger E, **Seiser C** (1999) Histone deacetylase 1 can repress transcription by binding to Sp1. **Mol. Cell. Biol**. 19:5504-5511

*7.* Lagger G, Doetzlhofer A, Schuettengruber B, Haidweger E, Simboeck E, Tischler J, Chiocca S, Suske G, Rotheneder H, Wintersberger E, and **Seiser C** (2003) The tumor suppressor p53 and the deacetylase HDAC1 are antagonistic regulators of the Cyclin-dependent Kinase inhibitor p21/WAF1/CIP1 gene. **Mol. Cell. Biol**. 23:2669-2679

*8.* Zupkovitz G, Tischler J, Posch M, Sadzak I, Ramsauer K, Egger G, Grausenburger R, Schweifer N, Decker T, and **Seiser C** (2006) Negative and positive regulation of gene expression by mouse histone deacetylase 1 **Mol. Cell. Biol**. 26:7913-7928

*9.* Winter S, Simboeck E, Fischle W, Zupkovitz G, Dohnal I, Mechtler K, Ammerer G, **Seiser C** (2008) 14-3-3 Proteins recognize a histone code at histone H3 and are required for transcriptional activation. **EMBO J**. 27:88-99

*10.* Lagger S, Meunier D, Mikula M, Brunmeir R, Schlederer M, Artaker M, Pusch O, Egger G, Hagelkruys A, Mikulits W, Weitzer G, Muellner EW, Susani M, Kenner L*, **Seiser C*** (2010) Crucial Function of Histone Deacetylase 1 for Differentiation of Teratomas in Mice and Humans. **EMBO J**. 29:3992-4007 (*C.S. + L.K. are co-senior authors)