

## Hubertus Haas

### Biographical sketch

My fascination in fungi was initiated during my Diploma and Ph.D. theses. In collaboration with Sandoz GmbH, Kundl, I established here a genetic transformation system for the penicillin-producer *Penicillium chrysogenum*, purified extracellular proteins of this fungus, cloned the encoding genes and established expression systems on the basis of their promoters. Inspired by my PosDoc in George Marzluf's lab (Ohio State University), I subsequently focused on gene regulation in filamentous fungi. The current research focus is the elucidation of fungal specific pathways and regulatory circuits to optimize biotechnological and medical applications. For example, we demonstrated that iron homeostatic mechanisms, including siderophore biosynthesis, are crucial for virulence of *Aspergillus fumigatus* and other fungal species and offer great potential to improve therapy and diagnosis of fungal infections, e.g. by <sup>68</sup>Ga-siderophore-mediated *in vivo* PET imaging.

### Curriculum vitae

Biocenter at Medical University Innsbruck (MUI)  
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**Date of birth** 3. September 1963  
**Place of birth** Kufstein, Austria  
**Citizenship** Austrian

### Education

1982 Matura, BRG Wörgl, Austria  
1988 Magister/Master in Microbiology, University of Innsbruck, Austria  
2002 PhD in Microbiology/Biochemistry, Department of Microbiology, University of Innsbruck, Austria, Austria

### Career History

1991 Visiting Scientist, MPI/Molecular Genetics (Prof. Wittman)/Berlin/Germany  
1991-92 Research Assistant, Department of Medical Microbiology, University of Innsbruck  
1993-94 PostDoc, Department of Molecular Biology/The Ohio State University/USA (Prof. G. Marzluf)  
1994-1999 Assistant Professor, Department of Medical Microbiology, University of Innsbruck, research group leader "Molecular Microbiology"  
1999 "Habilitation (*venia docendi*)" for Microbiology  
since 2000 Associate Professor (ao.Univ.-Prof.), Division of Molecular Biology, Biocenter, Innsbruck Medical University

### Fellowships,

EMBO short term fellowship/1991 (Max-Planck-Institute Berlin/Germany)  
Erwin Schrödinger fellowship/1993-94 (The Ohio State University/USA)

### Awards

Höchst Award/1995  
Prof-Brandl Award/1997  
CAST Life Science Business Award/2004 (together with M. Schrettl)

**Publications** Number of publications=129 (including 10 "Reviews" and one "Insight"), number of first/corresp. author publications=57, h-index=50, cited>8550, average citation per item>65, impact factor>600  
[Google Scholar link](#)

**Patents** Schrettl M and Haas H. Inhibitors of siderophore biosynthesis in fungi. PCT/EP2005/002654. (Patent issued 11/03/ 2005). *Terminated*  
 Schrettl M, Carberry S, Kavanagh K, Haas H, Doyle S. Selection marker for transformation of fungi based on gliotoxin resistance. PCT/IE2008/000091. Patent filed on 22/09/2008)

**Other Functions** Reviewer for 16 research agencies and 44 journals; editorial board member: Biometals, Frontiers in Microbiology; ERA-NET-Infect external advisory board member; scientific advisory board member of the Leibniz Institute for Natural Product Research and Infection Biology, Jena/Germany; Austrian representative of COST Action CA15133 (The Biogenesis of Iron-sulfur Proteins (FeSBioNet))

**Research Interests** Fungal molecular biology, metabolism and physiology with a particular focus on iron metabolism/regulation, virulence and secondary metabolism of *Aspergilli*.

**Funds obtained (in €, 5 most important ones)**

<b>ERA-NET Pathogenomics/FWF I282-B09</b> Transcriptional networks controlling virulence in filamentous fungal pathogens (TRANSPAT)	240.000	FWF	2009-2013
<b>CD Laboratory Project-Module:</b> Fungal Biotechnology/Module: oxygen regulation and stress in biotechnologically used filamentous fungi	490.000	Christian Doppler Forschungsgesellschaft	2010-2015
<b>Infect-ERA/FWF I616-B22</b> Systematic identification of antifungal drug targets by a metabolic network approach (AspMetNet)	168.000	FWF	2014-2017
<b>FWF DACH I1346-B21</b> Novel molecular mechanisms of iron sensing and homeostasis in filamentous fungi	312.000	FWF	2014-2017
<b>W-1253: HOROS</b> Host Response in Opportunistic Infections - Doctoral Programme; 1 <sup>st</sup> & 2 <sup>nd</sup> funding period	174.000 & 186.000	FWF	2014-2022

**PhD students since 2013**

PhD Student	PhD Thesis	Start	Defense	Paper
Fabio Gsaller	Iron homeostasis maintenance in <i>Aspergillus fumigatus</i> and <i>Acremonium chrysogenum</i> .	2010	2013	6
Nicola Beckmann	The interplay of iron, heme and oxygen adaptation in <i>Aspergillus fumigatus</i>	2010	2013	7
Lukas Schafferer	Link between iron homeostasis, ornithine	2011	2015	9

	metabolism, sulphur regulation and virulence in filamentous Ascomycetes			
Beatrix E. Lechner	The role of iron in fungal primary and secondary metabolism as well as in microbial interaction	2012	2016	9
Anna-Maria Dietl	Identification and of novel targets for antifungal treatment	2014	ongoing	4
Thomas Orasch	Siderophores as biomarker for invasive fungal infections	2014	ongoing	1
Matthias Misslinger	Iron-sensing in <i>Aspergillus fumigatus</i>	2014	ongoing	1
Verena Petzer, MD, co-supervision with GW	Regulatory function of bone marrow macrophages in erythropoiesis/role of iron homeostasis in fungal infection	2016	ongoing	3
Mario Aguar	Siderophore uptake in <i>Aspergillus fumigatus</i>	2018	ongoing	

### International collaborators

	Project	Joint public.	lab for stay abroad
Axel Brakhage (HKI/Leibnitz Institute, Jena, DE)	Fungal physiology, and virulence	14	yes
Robert Cramer (Geisel School of Medicine, Dartmouth, USA)	Fungal hypoxia adaptation, virulence	4	yes
Elaine Bignell (University of Manchester)	Fungal transcription factors, virulence	6	yes

**International Networks:** COST Action CA15133: The Biogenesis of Iron-sulfur Proteins; Infect-ERA: Identification of fungal drug targets (AspMetNet); FWF/DACH I1346: Iron sensing in *Aspergillus fumigatus*.

### Hubertus Haas; 10 most important scientific publications

1. Dietl AM, Amich J, Leal S, Beckmann N, Binder U, Beilhack A, Pearlman E, **Haas H**. Histidine biosynthesis plays a crucial role in metal homeostasis and virulence of *Aspergillus fumigatus*. **Virulence**. 2016 May 18; 7(4):465-76. PMID: 26854126
2. **Haas H\***, Petrik M, Decristoforo C\*. An iron-mimicking, Trojan horse-entering fungi--has the time come for molecular imaging of fungal infections? **PLoS Pathog**. 2015 Jan 29; 11(1):e1004568. PMID: 25634225. \*corresponding authors.
3. Gsaller F, Hortschansky P, Beattie SR, Klammer V, Tuppatsch K, Lechner BE, Rietzschel N, Werner ER, Vogan AA, Chung D, Mühlenhoff U, Kato M, Cramer RA, Brakhage AA, **Haas H**. The Janus transcription factor HapX controls fungal adaptation to both iron starvation and iron excess. **EMBO J**. 2014 Oct 1; 33(19):2261-76. PMID: 25092765
4. Yasmin S, Alcazar-Fuoli L, Gründlinger M, Puempel T, Cairns T, Blatzer M, Lopez JF, Grimalt JO, Bignell E, **Haas H**. Mevalonate governs interdependency of ergosterol and siderophore biosyntheses in the fungal pathogen *Aspergillus fumigatus*. **Proc Natl Acad Sci U S A**. 2012 Feb 21; 109(8):E497-504. PMID: 22106303
5. Blatzer M, Barker BM, Willger SD, Beckmann N, Blosser SJ, Cornish EJ, Mazurie A, Grahl N, **Haas H\***, Cramer RA\*. SREBP coordinates iron and ergosterol homeostasis to mediate triazole drug and hypoxia responses in the human fungal pathogen *Aspergillus fumigatus*. **PLoS Genet**. 2011 Dec; 7(12):e1002374. PMID: 22144905. \*corresponding authors.
6. Schrettl M, Beckmann N, Varga J, Heinekamp T, Jacobsen ID, Jöchl C, Moussa TA, Wang S,

- Gsaller F, Blatzer M, Werner ER, Niermann WC, Brakhage AA, **Haas H**. HapX-mediated adaptation to iron starvation is crucial for virulence of *Aspergillus fumigatus*. **PLoS Pathog**. 2010 Sep 30; 6(9):e1001124. PMID: 20941352
7. Schrettl M, Bignell E, Kragl C, Sabiha Y, Loss O, Eisendle M, Wallner A, Arst HN Jr, Haynes K, **Haas H**. Distinct roles for intra- and extracellular siderophores during *Aspergillus fumigatus* infection. **PLoS Pathog**. 2007 Sep 28; 3(9):1195-207. PMID: 17845073
  8. Hortschansky P, Eisendle M, Al-Abdallah Q, Schmidt AD, Bergmann S, Thoen M, Kniemeyer O, Abt B, Seeber B, Werner ER, Kato M, Brakhage AA & **Haas H** (2007). Interaction of HapX with the CCAAT-binding complex - a novel mechanism of gene regulation by iron. **EMBO J**. 2007 Jul 11; 26(13):3157-68. PMID: 17568774
  9. Nierman WC et al (98 authors including **Haas H**). Genomic sequence of the pathogenic and allergenic *Aspergillus fumigatus*. **Nature**. 2005 Dec 22; 438(7071):1151-6. Erratum in: *Nature*. 2006 Jan 26; 439(7075):502. PMID: 16372009
  10. Schrettl M, Bignell E, Kragl C, Joechl C, Rogers T, Arst HN Jr, Haynes K, **Haas H**. Siderophore biosynthesis but not reductive iron assimilation is essential for *Aspergillus fumigatus* virulence. **J Exp Med**. 2004 Nov 1; 200(9):1213-9. PMID: 15504822

#### **Hubertus Haas; all publications since 2013**

1. Sass G, Nazik H, Penner J, Shah H, Rahman S, Clemons KV, Groleau M-C, Dietl A-M, Visca P, **Haas H**, Déziel E, Stevens DA. Studies of *Pseudomonas aeruginosa* mutants indicate pyoverdine as the central factor in inhibition of *Aspergillus fumigatus* biofilm. **J. Bacteriol**. 2017 Dec 5;200(1). pii: e00345-17. PMID: 29038255
2. Hsu JL, Clemons KV, Manouvakhova OV, Inayathullah M, Tu AB, Sobel RA, Nazik H, Pothineni VR, Pasupneti S, Jiang X, Tian W, Rajadas J, **Haas H**, Aurelian L, Stevens DA, Nicolls MR. Microhemorrhage-associated tissue iron enhances the risk for *Aspergillus fumigatus* invasion in murine tracheal transplantation. **Science Transl Med** 2018 Feb 21;10(429). pii: eaag2616. PMID: 29467298
3. Petrik M, Zhai C, **Haas H**, Decristoforo C. Siderophores for molecular imaging applications. **Clin Transl Imaging**. 2017;5(1):15-27. PMID: 28138436
4. Nairz M, Schroll A, Haschka D, Dichtl S, Tymoszyk P, Demetz E, Moser P, **Haas H**, Fang FC, Theurl I, Weiss G. Genetic and dietary iron overload differentially affect the course of *Salmonella* Typhimurium infection. **Front Microbiol** 2017 Apr 11;7:110. PMID: 28443246
5. Summer S, Großrubatscher L, Petřík M, Michalčíková T, Nový Z, Rangger C, Klingler M, **Haas H**, von Guggenberg E, Haubner R, Decristoforo C. Developing targeted hybrid dual-modality imaging probes by chelator scaffolding. **Bioconjug Chem** 2017 Jun 21;28(6):1722-1733. PMID: 28462989
6. Orasch T, Prattes J, Faserl K, Eigl S, Düttmann W, Lindner H, **Haas H\***, Hoenigl H\*. Bronchoalveolar lavage triacetylfusarinine C determination for diagnosis of invasive pulmonary aspergillosis in patients with hematological malignancies. **J Infect** 2017 Oct;75(4):370-373. PMID: 28576596. Letter to the Editor. \*corresponding authors
7. Misslinger M, Gsaller F, Hortschansky P Müller C, Bracher F, Bromley MJ, **Haas H**. The cytochrome *b<sub>5</sub>* CybE is regulated by iron availability and is crucial for azole resistance of *A. fumigatus*. **Metallomics** 9:1655-1665.2017 Nov 15;9(11):1655-1665. PMID: 29072765

8. Hortschansky P, **Haas H**, Huber EM, Groll M, Brakhage AA. The CCAAT-binding complex (CBC) in *Aspergillus* species. **Biochim Biophys Acta**. 2016 Dec 8. pii: S1874-9399(16)30284-X. PMID: 27939757
9. Sheridan KJ, Lechner BE, Keefe GO, Keller MA, Werner ER, Lindner H, Jones GW, **Haas H\***, Doyle S\*. Ergothioneine Biosynthesis and Functionality in the Opportunistic Fungal Pathogen, *Aspergillus fumigatus*. **Sci Rep**. 2016 Oct 17; 6:35306. PMID: 27748436. \*corresponding authors.
10. Pasricha S, Schafferer L, Lindner H, Joanne Boyce K, **Haas H**, Andrianopoulos A. Differentially regulated high-affinity iron assimilation systems support growth of the various cell types in the dimorphic pathogen *Talaromyces marneffe*. **Mol Microbiol**. 2016 Nov; 102(4):715-737. PMID: 27558514
11. Gsaller F, Hortschansky P, Furukawa T, Carr PD, Rash B, Capilla J, Müller C, Bracher F, Bowyer P, **Haas H**, Brakhage AA, Bromley MJ. Sterol Biosynthesis and Azole Tolerance Is Governed by the Opposing Actions of SrbA and the CCAAT Binding Complex. **PLoS Pathog**. 2016 Jul 20; 12(7):e1005775. Erratum in: *PLoS Pathog*. 2016 Dec 14; 12 (12):e1006106. PMID: 27438727
12. Kaldorf M, Srivastava M, Gupta SK, Liang C, Binder J, Dietl AM, Meir Z, **Haas H**, Oshero N, Krappmann S, Dandekar T. Systematic Identification of Anti-Fungal Drug Targets by a Metabolic Network Approach. **Front Mol Biosci**. 2016 Jun 17; 3:22. PMID: 27379244
13. Zhai C, Franssen GM, Petrik M, Laverman P, Summer D, Rangger C, Haubner R, **Haas H**, Decristoforo C. Comparison of Ga-68-Labeled Fusarinine C-Based Multivalent RGD Conjugates and [(68)Ga]NODAGA-RGD-In Vivo Imaging Studies in Human Xenograft Tumors. **Mol Imaging Biol**. 2016 Oct; 18(5):758-67. PMID: 26905697
14. Dietl AM, Amich J, Leal S, Beckmann N, Binder U, Beilhack A, Pearlman E, **Haas H**. Histidine biosynthesis plays a crucial role in metal homeostasis and virulence of *Aspergillus fumigatus*. **Virulence**. 2016 May 18; 7(4):465-76. PMID: 26854126
15. Ben Yaakov D, Rivkin A, Mircus G, Albert N, Dietl AM, Kovalerchick D, Carmeli S, **Haas H**, Kontoyiannis DP, Oshero N. Identification and characterization of haemofungin, a novel antifungal compound that inhibits the final step of haem biosynthesis. **J Antimicrob Chemother**. 2016 Apr; 71(4):946-52. PMID: 26747101
16. Petrik M, Zhai C, Novy Z, Urbanek L, **Haas H**, Decristoforo C. In Vitro and In Vivo Comparison of Selected Ga-68 and Zr-89 Labelled Siderophores. **Mol Imaging Biol**. 2016 Jun; 18(3):344-52. PMID: 26424719
17. **Haas H**. How to trigger a fungal weapon. **Elife**. 2015 Sep 1; 4. doi: 10.7554/eLife.10504. PMID: 26327696
18. Zhai C, Summer D, Rangger C, Franssen GM, Laverman P, **Haas H**, Petrik M, Haubner R, Decristoforo C. Novel Bifunctional Cyclic Chelator for (89)Zr Labeling-Radiolabeling and Targeting Properties of RGD Conjugates. **Mol Pharm**. 2015 Jun 1; 12(6):2142-50. PMID: 25941834
19. Schafferer L, Beckmann N, Binder U, Brosch G, **Haas H**. AmcA-a putative mitochondrial ornithine transporter supporting fungal siderophore biosynthesis. **Front Microbiol**. 2015 Apr 7; 6:252. PMID: 25904899
20. Zhai C, Summer D, Rangger C, **Haas H**, Haubner R, Decristoforo C. Fusarinine C, a novel siderophore-based bifunctional chelator for radiolabeling with Gallium-68. **J Labelled Comp**

**Radiopharm.** 2015 May 15; 58(5):209-14. PMID: 25874571

21. Baldin C, Valiante V, Krüger T, Schafferer L, **Haas H**, Kniemeyer O, Brakhage AA. Comparative proteomics of a tor inducible *Aspergillus fumigatus* mutant reveals involvement of the Tor kinase in iron regulation. **Proteomics.** 2015 Jul; 15(13):2230-43. PMID: 25728394
22. Briard B, Bomme P, Lechner BE, Mislin GL, Lair V, Prévost MC, Latgé JP, **Haas H**, Beauvais A. *Pseudomonas aeruginosa* manipulates redox and iron homeostasis of its microbiota partner *Aspergillus fumigatus* via phenazines. **Sci Rep.** 2015 Feb 10; 5:8220. PMID: 25665925
23. **Haas H\***, Petrik M, Decristoforo C\*. An iron-mimicking, Trojan horse-entering fungi--has the time come for molecular imaging of fungal infections? **PLoS Pathog.** 2015 Jan 29; 11(1):e1004568. PMID: 25634225. \*corresponding authors.
24. Hortschansky P, Ando E, Tuppatsch K, Arikawa H, Kobayashi T, Kato M, **Haas H**, Brakhage AA. Deciphering the combinatorial DNA-binding code of the CCAAT-binding complex and the iron-regulatory basic region leucine zipper (bZIP) transcription factor HapX. **J Biol Chem.** 2015 Mar 6; 290(10):6058-70. PMID: 25589790
25. Knetsch PA, Zhai C, Rangger C, Blatzer M, **Haas H**, Kaeopookum P, Haubner R, Decristoforo C. [(68)Ga]FSC-(RGD)<sub>3</sub> a trimeric RGD peptide for imaging  $\alpha v \beta 3$  integrin expression based on a novel siderophore derived chelating scaffold-synthesis and evaluation. **Nucl Med Biol.** 2015 Feb; 42(2):115-22. PMID: 25459110
26. Wiemann P, Lechner BE, Baccile JA, Velk TA, Yin WB, Bok JW, Pakala S, Losada L, Nierman WC, Schroeder FC, **Haas H**, Keller NP. Perturbations in small molecule synthesis uncovers an iron-responsive secondary metabolite network in *Aspergillus fumigatus*. **Front Microbiol.** 2014 Oct 24; 5:530. PMID: 25386169
27. Chung D, Barker BM, Carey CC, Merriman B, Werner ER, Lechner BE, Dhingra S, Cheng C, Xu W, Blosser SJ, Morohashi K, Mazurie A, Mitchell TK, **Haas H**, Mitchell AP, Cramer RA. ChIP-seq and in vivo transcriptome analyses of the *Aspergillus fumigatus* SREBP SrbA reveals a new regulator of the fungal hypoxia response and virulence. **PLoS Pathog.** 2014 Nov 6; 10(11):e1004487. Erratum in: *PLoS Pathog.* 2014 Nov; 10(11):e1004576. PMID: 25375670
28. Petrik M, Vlckova A, Novy Z, Urbanek L, **Haas H**, Decristoforo C. Selected <sup>68</sup>Ga-siderophores versus <sup>68</sup>Ga-colloid and <sup>68</sup>Ga-citrate: biodistribution and small animal imaging in mice. **Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub.** 2015 Mar; 159(1):60-6. PMID: 25363728
29. Bertuzzi M, Schrettl M, Alcazar-Fuoli L, Cairns TC, Muñoz A, Walker LA, Herbst S, Safari M, Cheverton AM, Chen D, Liu H, Saijo S, Fedorova ND, Armstrong-James D, Munro CA, Read ND, Filler SG, Espeso EA, Nierman WC, **Haas H**, Bignell EM. The pH-responsive PacC transcription factor of *Aspergillus fumigatus* governs epithelial entry and tissue invasion during pulmonary aspergillosis. **PLoS Pathog.** 2014 Oct 16; 10(10):e1004413. Erratum in: *PLoS Pathog.* 2015 Apr; 11(4):e1004802. PMID: 25329394
30. Silva-Bailão MG, Bailão EF, Lechner BE, Gauthier GM, Lindner H, Bailão AM, **Haas H**, de Almeida Soares CM. Hydroxamate production as a high affinity iron acquisition mechanism in *Paracoccidioides* spp. **PLoS One.** 2014 Aug 26; 9(8):e105805. PMID: 25157575
31. **Haas H.** Fungal siderophore metabolism with a focus on *Aspergillus fumigatus*. **Nat Prod Rep.** 2014 Oct; 31(10):1266-76. PMID: 25140791
32. Gsaller F, Hortschansky P, Beattie SR, Klammer V, Tuppatsch K, Lechner BE, Rietzschel N, Werner ER, Vogan AA, Chung D, Mühlenhoff U, Kato M, Cramer RA, Brakhage AA, **Haas H.**

The Janus transcription factor HapX controls fungal adaptation to both iron starvation and iron excess. **EMBO J.** 2014 Oct 1; 33(19):2261-76. PMID: 25092765

33. Franken AC, Lechner BE, Werner ER, **Haas H**, Lokman BC, Ram AF, van den Hondel CA, de Weert S, Punt PJ. Genome mining and functional genomics for siderophore production in *Aspergillus niger*. **Brief Funct Genomics.** 2014 Nov; 13(6):482-92. PMID: 25062661
34. Hillmann F, Linde J, Beckmann N, Cyrulies M, Strassburger M, Heinekamp T, **Haas H**, Guthke R, Kniemeyer O, Brakhage AA. The novel globin protein fungogloblin is involved in low oxygen adaptation of *Aspergillus fumigatus*. **Mol Microbiol.** 2014 Aug; 93(3):539-53. PMID: 24948085
35. Vergeiner S, Schafferer L, **Haas H\***, Müller T\*. Improved MALDI-TOF microbial mass spectrometry imaging by application of a dispersed solid matrix. **J Am Soc Mass Spectrom.** 2014 Aug; 25(8):1498-501. PMID: 24894842. \*corresponding authors.
36. Albarouki E, Schafferer L, Ye F, von Wirén N, **Haas H**, Deising HB. Biotrophy-specific downregulation of siderophore biosynthesis in *Colletotrichum graminicola* is required for modulation of immune responses of maize. **Mol Microbiol.** 2014 Apr; 92(2):338-55. PMID: 24674132
37. Blatzer M, Gsaller F, Abt B, Schrettl M, Specht T, **Haas H**. An endogenous promoter for conditional gene expression in *Acremonium chrysogenum*: the xylan and xylose inducible promoter *xy11(P.)*. **J Biotechnol.** 2014 Jan; 169:82-6. PMID: 24246269
38. Franken AC, Werner ER, **Haas H**, Lokman BC, van den Hondel CA, Ram AF, de Weert S, Punt PJ. The role of coproporphyrinogen III oxidase and ferrochelatase genes in heme biosynthesis and regulation in *Aspergillus niger*. **Appl Microbiol Biotechnol.** 2013 Nov; 97(22):9773-85. PMID: 24113826
39. Haselwandter K, Häninger G, Ganzera M, **Haas H**, Nicholson G, Winkelmann G. Linear fusigen as the major hydroxamate siderophore of the ectomycorrhizal Basidiomycota *Laccaria laccata* and *Laccaria bicolor*. **Biometals.** 2013 Dec; 26(6):969-79. PMID: 24057327
40. Gründlinger M, Gsaller F, Schrettl M, Lindner H, **Haas H**. *Aspergillus fumigatus* SidJ mediates intracellular siderophore hydrolysis. **Appl Environ Microbiol.** 2013 Dec; 79(23):7534-6. PMID: 24038704
41. Amich J, Schafferer L, **Haas H**, Krappmann S. Regulation of sulphur assimilation is essential for virulence and affects iron homeostasis of the human-pathogenic mould *Aspergillus fumigatus*. **PLoS Pathog.** 2013; 9(8):e1003573. PMID: 24009505
42. Steinchen W, Lackner G, Yasmin S, Schrettl M, Dahse HM, **Haas H\***, Hoffmeister D\*. Bimodular peptide synthetase SidE produces fumarylalanine in the human pathogen *Aspergillus fumigatus*. **Appl Environ Microbiol.** 2013 Nov; 79(21):6670-6. PMID: 23974138. \*corresponding authors.
43. Leal SM Jr, Roy S, Vareechon C, Carrion Sd, Clark H, Lopez-Berges MS, Di Pietro A, Schrettl M, Beckmann N, Redl B, **Haas H**, Pearlman E. Targeting iron acquisition blocks infection with the fungal pathogens *Aspergillus fumigatus* and *Fusarium oxysporum*. **PLoS Pathog.** 2013; 9(7):e1003436. Erratum in: *PLoS Pathog.* 2013 Jul; 9(7). PMID: 23853581
44. Beckmann N, Schafferer L, Schrettl M, Binder U, Talasz H, Lindner H, **Haas H**. Characterization of the Link between Ornithine, Arginine, Polyamine and Siderophore Metabolism in *Aspergillus fumigatus*. **PLoS One.** 2013 Jun 18; 8(6):e67426. PMID: 23825660

45. Petrik M, **Haas H**, Laverman P, Schrettl M, Franssen GM, Blatzer M, Decristoforo C. <sup>68</sup>Ga-triacetylfusarinine C and <sup>68</sup>Ga-ferrioxamine E for *Aspergillus* infection imaging: uptake specificity in various microorganisms. **Mol Imaging Biol.** 2014 Feb; 16(1):102-8. PMID: 23818006
46. Gründlinger M, Yasmin S, Lechner BE, Geley S, Schrettl M, Hynes M, **Haas H**. Fungal siderophore biosynthesis is partially localized in peroxisomes. **Mol Microbiol.** 2013 Jun; 88(5):862-75. PMID: 23617799
47. López-Berges MS, Turrà D, Capilla J, Schafferer L, Matthijs S, Jöchl C, Cornelis P, Guarro J, **Haas H**, Di Pietro A. Iron competition in fungus-plant interactions: the battle takes place in the rhizosphere. **Plant Signal Behav.** 2013 Feb; 8(2):e23012. PMID: 23299422
48. Gsaller F, Eisendle M, Lechner BE, Schrettl M, Lindner H, Müller D, Geley S, **Haas H**. The interplay between vacuolar and siderophore-mediated iron storage in *Aspergillus fumigatus*. **Metallomics.** 2012 Dec; 4(12):1262-70. PMID: 23151814
49. Chung D, **Haas H**, Cramer RA. Coordination of hypoxia adaptation and iron homeostasis in human pathogenic fungi. **Front Microbiol.** 2012 Nov 6; 3:381. PMID: 23133438
50. Gsaller F, Blatzer M, Abt B, Schrettl M, Lindner H, **Haas H**. The first promoter for conditional gene expression in *Acremonium chrysogenum*: iron starvation-inducible mir1(P). **J Biotechnol.** 2013 Jan 10; 163(1):77-80. PMID: 23089729