

CURRICULUM VITAE

Robert Huber

Born: February 20, 1937 in München

Grammar school and humanistisches Gymnasium in München

Robert Huber was born in 1937 in Munich. He studied chemistry at the Technische Universität München (TUM), where he also completed his Ph.D. and habilitation. Since 1972, he has been a member of the Max-Planck-Gesellschaft and Director at the Max-Planck-Institut für Biochemie until his retirement in 2005. Since 1976, he also serves at the TUM as a Professor. He holds appointments as Guest Professor at the Universität Duisburg-Essen (Germany), the Cardiff University (Great Britain), the Universidad Autonoma de Barcelona (Spain), and the Seoul National University (Korea). He serves as a member of the Board and/or Scientific Advisory Board of a number of pharmaceutical and crop science companies, and he is co-founder of two companies, Proteros and Suppremol, located in Martinsried and offering services for drug discovery and development and for the development of novel therapies for autoimmune diseases, respectively. Huber has made major contributions to the understanding of the structure and function of biological macromolecules. He has studied proteases and their natural and synthetic inhibitors, metalloenzymes (iron, nickel, molybdenum, copper), proteins of the immune system (antibodies and antibody receptors), protein hormones and their receptors, protein kinases, enzymes of amino acid biosynthesis, enzymes of cofactor and vitamin biosynthesis and proteins of energy and electron transfer. In addition, he has contributed to the development of instruments for data collection and to methods in protein crystallography, particularly Patterson methods, graphic methods, and refinement, to the use of electron rich metal clusters, and most recently to the methods and instruments for crystal improvement. He has been honoured by numerous honorary doctorates, professorships, memberships in learned societies and awards, including the Otto-Warburg Medal, the Emil von Behring Medal, the Sir Hans Krebs Medal, the The Linus Pauling Medal, Max Tishler Prize and, in 1988, the Nobel Prize for Chemistry together with H. Michel and J. Deisenhofer.

Professional education and positions:

- Diploma in Chemistry, Technische Universität München, (1960);
- Dr. rer. nat., Technische Universität München, (1963);
- Habilitation, Technische Universität München, (1968);
- Scientific Member of the Max-Planck-Gesellschaft and Director at the Max-Planck-Institut für Biochemie, (1972-2005);
- Director Emeritus (2005);
- Apl. Professor, Technische Universität München, (1976);
- Visiting Professor Universitat Autonoma de Barcelona (2001);
- Visiting Professor National University of Singapore (2005);
- Gastprofessor Universität Duisburg-Essen (2005);
- Visiting Professor Cardiff University (2007);
- Visiting Professor KGIT, Korean German Institute of Technology, Seoul, Korea (2007);
- Editor: Journal of Molecular Biology.

Societies:

Member of the Deutsche Chemische Gesellschaft;
Member of the Gesellschaft für Biologische Chemie;
Honorary Member of the American Society of Biological Chemists;
Honorary Member of the Swedish Society for Biophysics;
Member of EMBO;
Honorary Member of the Japanese Biochemical Society;
Member of the Bayerische Akademie der Wissenschaften;
Member of the Deutsche Akademie der Naturforscher, Leopoldina;
Member of the European Academy of Arts, Sciences and Humanities;
Corresponding Member of the Croatian Academy of Sciences and Arts;
Member of the Accademia Nazionale dei Lincei, Rome;
Member of the 'Orden Pour le Mérite für Wissenschaften und Künste';
Associate Fellow, Third World Academy of Sciences, Trieste;
Foreign Associate, National Academy of Sciences, USA;
Fellow, American Academy of Microbiology;
Fellow of the Royal Society, London;
Honorary Member of the Sociedad Espanola de Bioquímica y Biología Molecular.

Honors:

E.K.-Frey Medal, Gesellschaft für Chirurgie, (1972);
Otto-Warburg Medal, Gesellschaft für Biologische Chemie, (1977);
Emil von Behring Medal, Universität Marburg, (1982);
Keilin Medal, Biochemical Society, London, (1987);
Richard-Kuhn Medal, Gesellschaft Deutscher Chemiker, (1987);
Dr. h.c. Université Catholique de Louvain, (1987);
Nobel Prize in Chemistry, (1988);
E.K.Frey - E. Werle Gedächtnismedaille, (1989);
Dr. h.c. University of Ljubljana, Slovenia (1989);
Kone Award, Association of Clinical Biochemists, United Kingdom, (1990);
Dr. h.c. for Medicine and Surgery, Università Tor Vergata, Rome, Italy, (1991);
Rudi Lemberg Travelling Fellowship (1991);
Sir Hans Krebs Medal, Federation of European Biochemical Societies, (1992);
Bayerischer Maximiliansorden für Wissenschaft und Kunst (1993);
The Linus Pauling Medal (1993/94);
Miami Winter Symposia, The Distinguished Service Award (1995);
Max Tishler Prize, Harvard University, USA (1997);
Max-Bergmann-Medaille des Max-Bergmann-Kreises zur Förderung der peptidchemischen Forschung, (1997);
Das Grosse Verdienstkreuz mit Stern und Schulterband der Bundesrepublik Deutschland, (1997);
Dr. h.c. Universidade Nova de Lisboa, Portugal (2000);
Dr. h.c. Universitat Autònoma de Barcelona, Spanien (2000);
Honorary Professor, Ocean University, Qingdao, China (2002);
Dr. h.c. Tsinghua University, Peking, (2003);
Honorary Professor, Peking University, Peking (2003);
Honorary Professor, Sichuan University, Chengdu (2003);
Honorary Professor, Shanghai Second Medical University, Shanghai (2004);
Röntgenplakette der Stadt Remscheid-Lennep, (2004);
Premio Città di Firenze sulle Scienze Molecolari, Florenz (2004);
Honorary Professor, Shanghai Jiao Tong University, China (2005);
'Lotte Distinguished Professorship', Seoul National University, Korea (2005);
Profesor Honorario de la Universidad de Sevilla (2006);

Dr. h.c. Nagoya University, Japan (2008).

Professional interests:

Structure and function of biological macromolecules, in particular those of large complex aggregates.

Systems studied:

Proteases and their natural and synthetic inhibitors;
metalloenzymes (iron, nickel, molybdenum, copper);
proteins of the immune system (antibodies and antibody receptors);
protein hormones and their receptors; protein kinases;
proteins of amino acid biosynthesis (PLP containing enzymes);
proteins of cofactor and vitamin biosynthesis; proteins of energy and electron transport.

Methods development:

Patterson methods in crystallography;
methods of structure determination of proteins and protein ligand complexes by NMR;
synthesis and use of electron rich metal clusters;
crystal annealing and improvement, methods and instruments;
analysis and evaluation of targets for research and application in pharmacology and crop science.

Co-founder and advisor of two Biotech Companies, Proteros (since 1997) and SuppreMol (since 2005).

Scientific advisor of International Pharma and Crop Science Companies.

The list of publications can be found in the Web : <http://www.biochem.mpg.de/xray/>

Publications

Chatwell, L., Illarionova, V., Illarionov, B., Eisenreich, W., Huber, R., Skerra, A., Bacher, A. and Fischer, M. (2008).[1170]

"Structure of Lumazine Protein, an optical transponder of luminescent bacteria."

J. Mol. Biol. **published online Jun 26**

Breithaupt, C., Schäfer, B., Pellkofer, H., Huber, R., Linington, C. and Jacob, U. (2008).[1169]

"Demyelinating myelin oligodendrocyte glycoprotein-specific autoantibody response is focused on one dominant conformational epitope region in rodents."

The Journal of Immunology **181**, 1255-1263.

Krojer, T., Pangerl, K., Kurt, J., Sawa, J., Stingl, C., Mechtler, K., Huber, R., Ehrmann, M. and Clausen, T. (2008).[1168]

"Interplay of PDZ and protease domain of DegP ensures efficient elimination of misfolded proteins."

Proc. Natl. Acad. Sci. USA **105**, 7702-7707.

Borelli, C., Ruge, E., Lee, J. H., Schaller, M., Vogelsang, A., Monod, M., Korting, H. C., Huber, R. and Maskos, K. (2008).[1167]

"X-ray structures of Sap1 and Sap5: Structural comparison of the secreted aspartic proteinases from *Candida albicans*."

Proteins **published online Apr 2**

Groll, M., Schellenberg, B., Bachmann, A. S., Archer, C. R., Huber, R., Powell, T. K., Lindow, S., Kaiser, M. and Dudler, R. (2008).[1166]

"A plant pathogen virulence factor inhibits the eukaryotic proteasome by a novel mechanism."
Nature **452**, 755-758.

Huber, R. and Sacharow-Ross, I. (2007).[1165]

Ein Wissenschaftler und ein Künstler im Gespräch.

Syntopia, Igor Sacharow-Ross. A. Niehaus and D. Ronte. Köln, Wienand Verlag: 128-137.

Debela, M., Hess, P., Magdolen, V., Schechter, N. M., Steiner, T., Huber, R., Bode, W. and Goettig, P. (2007).[1164]

"Chymotryptic specificity determinants in the 1.0 Å structure of the zinc-inhibited human tissue kallikrein 7."

Proc. Natl. Acad. Sci. USA **104**, 16086-16091.

Debela, M., Goettig, P., Magdolen, V., Huber, R., Schechter, N. M. and Bode, W. (2007).[1163]

"Structural basis of the zinc inhibition of human tissue kallikrein 5."

J. Mol. Biol. **373**, 1017-1031.

Velarde, M., Huber, R., Yanagisawa, S., Dennison, C. and Messerschmidt, A. (2007).[1162]

"Influence of loop shortening on the metal binding site of Cupredoxin Pseudoazurin."

Biochemistry **46**, 9981-9991.

Schmidt, M., Patel, A., Zhao, Y. and Reuter, W. (2007).[1161]

"Structural basis for the photochemistry of alpha-phycoerythrocyanin."

Biochemistry **46**, 416-423.

Tochowicz, A., Maskos, K., Huber, R., Oltenfreiter, R., Dive, V., Yiotakis, A., Zanda, M., Bode, W. and Goettig, P. (2007).[1160]

"Crystal structures of MMP-9 complexes with five inhibitors: Contribution of the flexible Arg424 side-chain to selectivity."

J. Mol. Biol. **371**, 989-1006.

Borelli, C., Ruge, E., Schaller, M., Monod, M., Korting, H. C., Huber, R. and Maskos, K. (2007).[1159]

"The crystal structure of the secreted aspartic proteinase 3 from *Candida albicans* and its complex with pepstatin A."

Proteins **68**, 738-748.

Kyrieleis, O. J., Huber, R., Ong, E., Oehler, R., Hunter, M., Madison, E. L. and Jacob, U. (2007).[1158]

"Crystal structure of the catalytic domain of DESC1, a new member of the type II transmembrane serine proteinase family."

FEBS J. **274**, 2148-2160.

Steiner, T., Lamerz, A. C., Hess, P., Breithaupt, C., Krapp, S., Bourenkov, G., Huber, R., Gerardy-Schahn, R. and Jacob, U. (2007). [1157]

"Open and closed structures of the UDP-glucose pyrophosphorylase from *Leishmania major*."
J. Biol. Chem. **282**, 13003-13010.

Keil, C., Maskos, K., Than, M., Hoopes, J. T., Huber, R., Tan, F., Deddish, P. A., Erdos, E. G., Skidgel, R. A. and Bode, W. (2007). [1156]

"Crystal structure of the human carboxypeptidase N (kininase I) catalytic domain."
J. Mol. Biol. **366**, 504-516.

Li, C., Yanagisawa, S., Martins, B. M., Messerschmidt, A., Banfield, M. J. and Dennison, C. (2006). [1155]

"Basic requirements for a metal-binding site in a protein: the influence of loop shortening on the cupredoxin azurin."

Proc. Natl. Acad. Sci. USA **103**, 7258-7263.

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J. Biol. Chem. **281**, 24818-24830.

Breithaupt, C., Kurzbauer, R., Lilie, H., Schaller, A., Strassner, J., Huber, R., Macheroux, P. and Clausen, T. (2006). [1152]

"Crystal structure of 12-oxophytodienoate reductase 3 from tomato: Self-inhibition by dimerization."

Proc. Natl. Acad. Sci. USA **103**, 14337-14342.

Tamulaitiene, G., Jakubauskas, A., Urbanke, C., Huber, R., Grazulis, S. and Siksnys, V. (2006). [1151]

"The crystal structure of the rare-cutting restriction enzyme SdaI reveals unexpected domain architecture."

Structure **14**, 1389-1400.

Debela, M., Magdolen, V., Grimminger, V., Sommerhoff, C., Messerschmidt, A., Huber, R., Friedrich, R., Bode, W. and Goettig, P. (2006). [1150]

"Crystal structures of human tissue kallikrein 4: activity modulation by a specific zinc binding site."

J. Mol. Biol. **362**, 1094-1107.

Sitar, T., Popowicz, G. M., Siwanowicz, I., Huber, R. and Holak, T. A. (2006). [1149]

"Structural basis for the inhibition of insulin-like growth factors by insulin-like growth factor-binding proteins."

Proc. Natl. Acad. Sci. USA **103**, 13028-13033.

Kaiser, M., Groll, M., Siciliano, C., Götz, M., Assfalg-Machleidt, I., Kohno, J., Milbradt, A., Renner, C., Huber, R. and Moroder, L. (2005). [1148]

Inhibition of yeast 20S proteasome by biaryl- ansbiaryl ether-cross-bridges tripeptide derivatives as TMC-95A analogs.

Peptides, Biology and Chemistry. K. L. Liu and J. P. Tam. Monmouth Junction, Science Press USA Inc.

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"Biosynthesis of riboflavin: Structure and properties of 2,5-Diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-phosphate reductase of *Methanocaldococcus jannaschii*."

J. Mol. Biol. **359**, 1334-1351.

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Mooser, D., Maneg, O., Corvey, C., Steiner, T., Malatesta, F., Karas, M., Soulimane, T. and Ludwig, B. (2005). [1145]

"A four-subunit cytochrome bc₁ complex complements the respiratory chain of *Thermus thermophilus*."

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"Synthesis of New N-(5-Oxo-2,5-dihydro)pyrrol-3-yl Glycines and N-(5-Oxo-2,5-dihydro)pyrrol-3-yl Glycines Esters."

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Groll, M., Larionov, O. V., Huber, R. and de Meijere, A. (2006). [1142]

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"Crystallization and preliminary X-ray analysis of the tungsten-dependent acetylene hydratase from *Pelobacter acetylenicus*."

Acta Cryst. **F61**, 299-301.

Beaufort, N., Debela, M., Creutzburg, S., Kellermann, J., Bode, W., Schmitt, M., Pidard, D. and Magdolen, V. (2006). [1140]

"Interplay of human tissue kallikrein 4 (hK4) with the plasminogen activation system: hK4 regulates the structure and functions of the urokinase-type plasminogen activator receptor (uPAR)."

Biol. Chem. **387**, 217-222.

Bode, W. (2006). [1139]

"Structure and interaction modes of thrombin."

Blood Cells Mol. Dis. **36**, 122-130.

Zeslawska, E., Jacob, U., Stürzebecher, J. and Oleksyn, B. J. (2006). [1138]

"The crystal structures of 3-TAPAP in complexes with the urokinase-type plasminogen activator and picrate."

Bioorg. Med. Chem. Lett. **16**, 228-234.

Rohr, K. B., Selwood, T., Marquardt, U., Huber, R., Schechter, N. M., Bode, W. and Than, M. E. (2005). [1137]

"X-ray structures of free and leupeptin-complexed human aI-tryptase mutants: Indication for an a->b-tryptase transition."

J. Mol. Biol. **357**, 195-209.

Kaiser, M., Groll, M., Götz, M., Siciliano, C., Assfalg-Machleidt, I., Weyher, E., Kohno, J., Milbradt, A., Renner, C., Huber, R. and Moroder, L. (2005). [1136]

Structural determinants for 20S proteasome inhibition by TMC-95A.

Peptides 2004. M. Flegel, M. Fridkin, C. Gilon and J. Slaninova. Geneve, Kenes International: 657-658.

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"Rigidity and flexibility of Dipeptidyl Peptidase IV: Crystal structures of and docking experiments with DPIV."

J. Mol. Biol. **355**, 768-783.

Golbik, R., Yu, C., Weyher-Stingl, E., Huber, R., Moroder, L., Budisa, N. and Schiene-Fischer, C. (2005). [1134]

"Peptidyl prolyl cis/trans-isomerases: comparative reactivities of cyclophilins, FK506-binding proteins, and parvulins with fluorinated oligopeptide and protein substrates."

Biochemistry **44**, 16026-16034.

Friedrich, R., Panizzi, P., Kawabata, S. I., Bode, W., Bock, P. E. and Fuentes-Prior, P. (2006). [1133]

"Structural basis for reduced staphylocoagulase-mediated bovine prothrombin activation."

J. Biol. Chem. **281**, 1188-1195.

Panizzi, P., Friedrich, R., Fuentes-Prior, P., Richter, K., Bock, P. E. and Bode, W. (2006). [1132]

"Fibrinogen substrate recognition by staphylocoagulase (pro)thrombin complexes."

J. Biol. Chem. **281**, 1179-1187.

Panizzi, P., Friedrich, R., Fuentes-Prior, P., Kroh, H. K., Briggs, J., Tans, G., Bode, W. and Bock, P. E. (2006). [1131]

"Novel fluorescent prothrombin analogs as probes of staphylocoagulase-prothrombin interactions."

J. Biol. Chem. **281**, 1169-1178.

Bayes, A., Comellas-Bigler, M., Rodriguez de la Vega, M., Maskos, K., Bode, W., Aviles, F. X., Jongsma, M. A., Beekwilder, J. and Vendrell, J. (2005). [1130]

"Structural basis of the resistance of an insect carboxypeptidase to plant protease inhibitors."

Proc. Natl. Acad. Sci. USA **102**, 16602-16607.

Ramsperger, A., Augustin, M., Schott, A. K., Gerhardt, S., Krojer, T., Eisenreich, W., Illarionov, B., Cushman, M., Bacher, A., Huber, R. and Fischer, M. (2006). [1129]

"Crystal structure of an archaeal pentameric riboflavin synthase in complex with a substrate analog inhibitor: Stereochemical implications."

J. Biol. Chem. **281**, 1224-1232.

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"Structure of the metal-independent restriction enzyme BfiI reveals fusion of a specific DNA-binding domain with a nonspecific nuclease."

Proc. Natl. Acad. Sci. USA **102**, 15797-15802.

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"Novel bacterial molybdenum and tungsten enzymes: three-dimensional structure, spectroscopy, and reaction mechanism."

Biol. Chem. **386**, 999-1006.

Buckel, W., Martins, B. M., Messerschmidt, A. and Golding, B. T. (2005). [1126]

"Radical-mediated dehydration reactions in anaerobic bacteria."

Biol. Chem. **386**, 951-959.

D'Silva, L., Ozdowy, P., Krajewski, M., Rothweiler, U., Singh, M. and Holak, T. A. (2005). [1125]

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J. Am. Chem. Soc. **127**, 13220-13226.

Than, M. E., Bourenkov, G., Henrich, S., Mann, K. and Bode, W. (2005). [1124]

"The NC1 dimer of human placental basement membrane collagen IV: does a covalent crosslink exist?"

Biol. Chem. **386**, 759-766.

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J. Mol. Biol. **353**, 222-231.

Groll, M. and Huber, R. (2005). [1122]

"Purification, crystallization, and x-ray analysis of the yeast 20S proteasome."

Methods in Enzymology **398**, 329-336.

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"Study of a major intermediate in the oxidative folding of leech carboxypeptidase inhibitor: Contribution of the fourth disulfide bond."

J. Mol. Biol. **352**, 961-975.

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"Crystal structure of the catalytic domain of human atypical protein kinase C- ι reveals interaction mode of phosphorylation site in turn motif."

J. Mol. Biol. **352**, 918-931.

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J. Biol. Chem. **280**, 31850-31858.

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J. Biol. Chem. **280**, 33387-33396.

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Proc. Natl. Acad. Sci. USA **102**, 8597-8602.

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J. Thromb. Haemost. **3**, 2379-2388.

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"The three-dimensional structures of tick carboxypeptidase inhibitor in complex with A/B carboxypeptidases reveal a novel double-headed binding mode."

J. Mol. Biol. **350**, 489-498.

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"Crystal structures of the tricorn interacting factor F3 from *Thermoplasma acidophilum*, a zinc aminopeptidase in three different conformations."

J. Mol. Biol. **349**, 787-800.

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Glycobiology **14**, 43R-51R.

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J. Mol. Biol. **349**, 99-112.

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