

Curriculum Vitae

Name and title:

Krug, Harald F. Prof. Dr.

Date and place of birth:

30.09.1952, Edermünde-Besse, Germany

Affiliation:

NanoCASE GmbH

Current Position:

Toxicologist / Consultant

Address

NanoCASE GmbH
St. Gallerstr. 58
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Scientific Vita:

1978: first state examination in Biology/Chemistry at the University of Kassel (passed with distinction)

1982: doctoral degree at the University of Göttingen, Institute of Zoology (highest degree)

1983: Postdoctoral Stipend at the GSF Forschungszentrum Munich

1986: Group leader position at the KfK, Institute for Genetics and Toxicology of Nuclides

1996: Head of Dep. of Molecular and Environmental Toxicology

1996: Habilitation "Environmental Toxicology" at the University of Karlsruhe

2001-2006: Speaker of the Study Group "Biochemical Pharmacology and Toxicology" of the GBM (German Society for Biochemistry and Molecular Biology; <http://www.gbm-online.de/pharmakologie-und-toxikologie.html>)

since 2002: Academic member of the DECHEMA Working Group "Responsible Production and Use of Nanomaterials" (<http://www.processnet.org/Fachgemeinschaften/Chemische+Reaktionstechnik/Responsible+Production+and+Use+of+Nanomaterials.html>), since 2005 member of the steering committee of this working group and since 2019 head of the steering committee

2004 - 2007: Member of the Council of the European Academy for the Research on the Consequences of Scientific and Technological Advance (<http://www.europaeische-akademie-aw.de>)

Project Group: Nanomaterials, Nanodevices, Nanocomputing

since 2005: appointed as a member of the "Nanobotschafter (Nano ambassador)", an initiative of the "Deutsches Museum" in Munich (<http://www.nanobotschafter.de/>)

March 2006-July 2009: appointed as the manager of the consortium "NanoCare", a research project of the German Ministry for Education and Research (<http://www.nanopartikel.info>)

September 2006: appointment to the EMPA in St. Gallen (Switzerland)

since January 2007: Head of Materials-Biology Interactions Lab at Empa, St. Gallen (<http://www.empa.ch/web/empa/particles-biology-interactions>)

March 2007: appointed as member of the Action Group "NanoDialog"

of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) (http://www.bmu.de/fileadmin/bmu-import/files/pdfs/allgemein/application/pdf/nanokomm_abschlussbericht_2008.pdf)

July 2007: appointed as member of the "Commission for Environmental Toxicology" of the Federal Office for the Environment (BAFU) of Switzerland (<http://www.bafu.admin.ch/>)

August 2008: appointed as "Titularprofessor" at the Medical Faculty, University of Berne

September 2008: founder member of the IANH, the „International Alliance for NanoEHS Harmonization“

October 2008: elected as a member of the foundation board of the "GEN SUISSE" foundation (<http://www.gensuisse.ch/>)

January 2009 – February 2014: appointed as member of the scientific board of the CNT-Initiative INNO-CNT, a BMBF-funded activity of the German Industry

January 2009: appointed as member of the ad-hoc working group of the DFG on "Food and Nanotechnology"

January 2010 – June 2013: Head of Department "Materials meet Life" at Empa, St. Gallen (<http://www.empa.ch/web/empa/materials-meet-life>)

December 2009 – May 2014: Member of the Board of Directors at Empa by the ETH-Board, Switzerland

Since January 2010: appointed as member of the EASAC-JRC Expert Group to study nanoparticles toxicity in order to assess the possible impact of nanomaterials on human health (<http://www.easac.eu/home/reports-and-statements/detail-view/article/first-joint.html>).

Since May 2010: appointed as member of the working group of the Federal Office for Internal Affairs on "Kommunikation and Dialog" regarding the Swiss Action Plan for Nanomaterials.

June 2010 to 2019: appointed as Advisory Board Member of the NANOTEC-Institute in Bangkok, Thailand (http://www2.nanotec.or.th/en/?page_id=120)

2011 - 2015: appointed as scientific board member of the Nano EHS funding program of the Austrian Government (<http://www.ffg.at/nano-ehs>)

2011: appointed as speaker of the scientific board of the German NanoCare/NanoNature Funding program (BMBF; <http://www.ptj.de/nanocare>; <http://www.ptj.de/nanonature>)

Since 2012: appointed as member of the international board for CAAT_{EU}, the Center for Alternatives to Animal Testing, Johns Hopkins University (<http://caat.jhsph.edu/about/advisoryboard.html>)

January 2013 – March 2013: visiting professor at the NANOTEC-Institute at the Thailand Science Park in Bangkok

June 2013: invited to be a member of the editorial board of the new journal "Nano Convergence", published by Springer

June 2013: appointed as member of the IUPAC-expert group on recent advances in nanoparticles and colloidal systems and their impact on human health (https://iupac.org/projects/project-details/?project_nr=2013-007-1-700)

January 2014: appointed as Co-Editor-in-Chief for the Journal STAM (Science & Technology of Advanced Materials) published by Empa

	<p>and NIMS (Japan) http://tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=tsta20</p> <p>January 2014: Founder of the Company “NanoCASE”, consulting and evaluation of processes and products with nanomaterials (www.nanocase.ch).</p> <p>June 2014: new position as International Research Cooperations Manager at Empa</p> <p>Since November 2015: Member and Chair of the Advisory Board “Umwelt” of the German BAM (https://www.bam.de/SharedDocs/DE/Downloads/organigramm.pdf?blob=publicationFile&v=8)</p> <p>Since June 2016: Member of the international Scientific Board of the newly established Database on Nanotechnology of SpringerNature (http://nano.nature.com/)</p> <p>Since October 2017: retired from position at Empa and University of Berne</p> <p>2018 – 2020: Member of the international advisory board of the DGUV-BAuA Project on analytics for nanofibers</p> <p>2017 to 2020: representative of Switzerland in the OECD-Project on „Advancing Adverse Outcome Pathway (AOP) Development for Nanomaterial Risk Assessment and Categorization”</p> <p>1979 – 1980: <i>Graduate scholarship, DFG</i></p> <p>1983 – 1985: <i>Ph.D. fellowship, GSF National Research Center for Environment and Health</i></p> <p>1994: <i>Price of the "Stiftung für Verhalten und Umwelt (VERUM)" at the 1st Int. Congress on Environmental Hygiene</i></p> <p>1998/2000: <i>best scientific presentations at the conferences of the Int. Acad. Tumor Marker Oncol. (IATMO) and the International Conference on the Bioscience of Lipids</i></p> <p>2003: <i>third price within the "Cinema of the Cell" Bioclip contest of the ELSO (Eur. Life Scientist Org.; http://www.else.org)</i></p> <p>2004: <i>one of five best presentations at the STS Conference in Weimar</i></p> <p>2006: <i>one of the best presentations at the MRIEM Conference in Paris</i></p> <p>2006: <i>DGK-Symp. cfi-Award (1.000€)</i></p> <p>2007: Scientific Award of Baden-Württemberg for Alternative Methods for Animal Testing (25.000€)</p> <p>2015: <i>Best Contribution (Poster) at the WING Conference in Dresden</i></p> <p>2017: <i>Best Contribution (Poster) at the EuroNanoForum in Malta</i></p>
<p>Scholarships / Awards:</p>	
<p>Memberships :</p>	<p>DECHEMA (incl. Fachsektion Nanotechnologie) Environmental Mutagen Society (GUM) German Society for Biochemistry and Molecular Biology (GBM) German Society for Cell Biology (DGZ) International Society for Aerosols in Medicine (ISAM) Signal Transduction Society (STS) Society of Hygiene, Environmental and Public Health Sciences – GHUP</p>
<p>Research Fields:</p>	<p>Biological mechanisms of action of alkylated metal compounds Cellular mechanisms of polybrominated diphenylethers main topics: cellular signalling cascades, hormone disrupting activity, stress and cell cycle Mechanisms of action of synthetic lipids main topic: induction of apoptosis in tumour cells</p>

Teaching:

Nanotoxicology: effects of nanomaterials on cells and tissues

Lectures at the TU Munich, 1984 - 1985:

Part of the lecture on "Environmental Biochemistry" of Prof. Dr. Jürgen Berndt

Teaching at the Fridericiana Karlsruhe since WS 1989/90:

Lecture "General Toxicology of Metals"

Lecture "General Environmental Toxicology"

Lecture "Molecular Toxicology of Xenobiotics"

Practical Course "Molecular Toxicology of Metals"

Practical Course "Cell Cycle and Apoptosis"

Lecture „Toxicology of Mycotoxins“

Teaching at the ETH Zürich since SS 2007 – SS 2014:

Lecture "FRONTIERS IN NANOTECHNOLOGY" Part

Nanotoxicology

Examination in "Umwelttoxikologie" – Diploma and Ph.D. students;

Koreferent for numerous Diploma and doctoral theses.

Training of lab assistants in biology of the FZK.

Invited lecturer at the Fortbildungszentrum für Technik und Umwelt

(FTU), the Sozial- und Arbeitsmedizinische Akademie Baden-

Württemberg e.V., Stuttgart, and the "Haus der Technik", Essen.

Invited lecturer of the CCMX-SPERU Course activities for students

Since Fall Semester 2008: Professorship at the University of Berne,

lectures in "Climate, environment and human health" at the

Oeschger Center, in "Nanotoxicology" at the Graduate School for

Cellular and Biomedical Sciences (GCB) of the University of Bern

(http://www.gcb.unibe.ch/content/index_eng.html)

Reviewing:

Referee inter alia for the following scientific journals

ACS Nano

ALTEX

Analytical and Bio-analytical Chemistry

Angewandte Chemie Int. Ed.

Archives of Toxicology

Beilstein Journal on Nanotechnology

BioNanoMaterials

ChemBioChem

Chem Res Toxicol

Chemosphere

Critical Reviews in Toxicology

Current Green Chemistry

Current Medicinal Chemistry

Environment International

Environmental Health Perspectives

Environmental Pollution

Environmental Science and Pollution Research

Environmental Science: Nano

Environmental Sciences Europe

Environmental Science and Technology

European Journal of Pharmaceutics and Biopharmaceutics

International Journal of Hygiene and Environmental Health

Journal of the American Chemical Society

Journal of Nanoparticle Research

NanoImpact

Nanomaterials

Nanomedicine

Nanotoxicology

Nature

Nature Nanotechnology

**Peer-reviewed Publications
(2015 to date and selected
papers):**

- Nature Protocols*
Part & Fibre Toxicol
Regul Toxicol Pharmacol
Sci Technol Adv Mat
Sci Rep
Signal Transduction
small
Toxicology
Toxicology and Environmental Health
Toxicology in vitro
Toxicology Letters
Toxicological Science
- and for the funding organisations
- Deutsche Krebshilfe e.V.
 - Schweizerischer Nationalfonds SNF
 - "Particle and Surface Engineering" Education and Research Unit (ERU) of the Competence Centre for Material Science and Technology (CCMX) in Switzerland
 - Deutsche Bundesstiftung Umwelt (DBU)
 - Fonds zur Förderung der wissenschaftlichen Forschung Österreich (FWF)
 - "NanoCare" BMBF, Germany
- Halappanavar, S., Ede, J.D., Shatkin, J.A., and Krug, H.F. (2019). A systematic process for identifying key events for advancing the development of nanomaterial relevant adverse outcome pathways. **NanoImpact 15**
- Krug, H., and Kraegeloh, A. (2019). Nanosafety: Where Are We Now and Where Must We Go? **Chem Res Toxicol 32**, 535
- Krug, H.F. (2019). New tools in risk assessment of nanomaterials. **NanoImpact 16**
- Petersen, E.J., Hirsch, C., Elliott, J.T., Krug, H.F., Aengenheister, L., Arif, A.T., Bogni, A., Kinsner-Ovaskainen, A., May, S., Walser, T., et al. (2019). Cause-and-effect analysis as a tool to improve the reproducibility of nanobioassays: four case studies. **Chem Res Toxicol**, early online
- Gubala, V., Johnston, L.J., Krug, H.F., Moore, C.J., Ober, C.K., Schwenk, M., and Vert, M. (2018a). Engineered nanomaterials and human health: Part 2. Applications and nanotoxicology (IUPAC Technical Report). **Pure Appl. Chem. 90**, 1325-1356
- Gubala, V., Johnston, L.J., Liu, Z., Krug, H.F., Moore, C.J., Ober, C.K., Schwenk, M., and Vert, M. (2018b). Engineered nanomaterials and human health: Part 1. Preparation, functionalization and characterization (IUPAC Technical Report). **Pure Appl. Chem. 90**, 1283-1324
- Krug, H.F. (2018). The uncertainty with nanosafety: Validity and reliability of published data. **Colloids Surf B Biointerfaces 172**, 113-117
- Krug, H.F., Bohmer, N., Kühnel, D., Marquardt, C., Nau, K., and Steinbach, C. (2018). The DaNa2.0 knowledge base nanomaterialis - an important measure accompanying nanomaterials development. **Nanomaterials 8**, 204
- Kühnel, D., Krug, H.F., and Kokalj, A.J. (2018). Environmental Impacts of Engineered Nanomaterials-Imbalances in the Safety Assessment of Selected Nanomaterials. **Materials (Basel) 11**
- Crawford, S.E., Hartung, T., Hollert, H., Mathes, B., van Ravenzwaay, B., Steger-Hartmann, T., Studer, C., Krug, H.F. (2017): Green Toxicology: a strategy for sustainable chemical and material development. **Environ. Sci. Eur. 29**(1), 16.

- Elliott, J.T., Rösslein, M., Song, N.W., Toman, B., Kinsner-Ovaskainen, A., Maniratanachote, R., Salit, M.L., Petersen, E.J., Sequeira, F., Romsos, E.L., Kim, S.J., Lee, J., Von Moos, N.R., Rossi, F., Hirsch, C., Krug, H.F., Suchaoin, W., Wick, P. (2017): Toward achieving harmonization in a nano-cytotoxicity assay measurement through an interlaboratory comparison study. **ALTEX** 34(2), 201-218.
- Krug, H.F., Nau, K. (2017): Zuverlässigkeit in der Nanosicherheitsforschung. **Chemie Ingenieur Technik** 89(3), 215-223.
- Kühnel, D., Marquardt, C., Nau, K., Krug, H.F., Paul, F., Steinbach, C. (2017): Environmental benefits and concerns on safety: communicating latest results on nanotechnology safety research—the project DaNa2.0. **Environ. Sci. Pollut. Res.** 24(12), 11120-11125.
- Pelaz B, Alexiou C, Alvarez-Puebla RA et al. (2017): Diverse Applications of Nanomedicine. **ACS Nano** 11(3), 2313-2381 (86 Authors).
- Schmutz, M., Som, C., Krug, H.F., Nowack, B. (2017): Digging below the surface: the hidden quality of the OECD nanosilver dossier. **Environ. Sci.: Nano** online first, <http://dx.doi.org/10.1039/C7EN00088J>
- Steinbach, C., Bohmer, N., Krug, H.F., Kühnel, D., Nau, K., Paul, F., Reithel, S., Marquardt, C. (2017): DaNa 2.0 - verlässliche Informationen zur Sicherheit von marktüblichen Nanomaterialien. **Chemie Ingenieur Technik** 89(3), 232-238.
- Nau, K., Krug, H.F. (2016): Sichere Nanomaterialien? **Physik J.** 15, 29-34.
- Nau, K., Bohmer, N., Kühnel, D., Marquardt, C., Paul, F., Steinbach, C., Krug, H.F. (2016): The DaNa2.0 knowledge base on nanomaterials - communicating current nanosafety research based on evaluated literature data. **J. Mat. Edu.** 38, 93-108.
- Gordon, S., Daneshian, M., Bouwstra, J., Caloni, F., Constant, S., Davies, D.E., Dandekar, G., Guzman, C.A., Fabian, E., Haltner, E., Hartung, T., Hasiwa, N., Hayden, P., Kandarova, H., Khare, S., Krug, H.F., Kneuer, C., Leist, M., Lian, G., Marx, U., Metzger, M., Ott, K., Prieto, P., Roberts, M.S., Roggen, E.L., Tralau, T., van den, B.C., Walles, H., Lehr, C.M. (2015): Non-animal models of epithelial barriers (skin, intestine and lung) in research, industrial applications and regulatory toxicology. **ALTEX** 32, 327-378.
- Grafmüller, S., Manser, P., Diener, L., Diener, P.A., Maeder-Althaus, X., Maurizi, L., Jochum, W., Krug, H.F., Buerki-Thurnherr, T., von Mandach, U., Wick, P. (2015): Bidirectional Transfer Study of Polystyrene Nanoparticles across the Placental Barrier in an Human Placental Perfusion Model. **Environ. Health Perspect.**, 123, 1280-1286.
- Grafmüller, S., Manser, P., Diener, L., Maurizi, L., Diener, P.A., Hofmann, H., Jochum, W., Krug, H.F., Buerki-Thurnherr, T., von Mandach, U., Wick, P. (2015): Transfer studies of polystyrene nanoparticles in the ex vivo human placenta perfusion model: key sources of artifacts. **Sci. Technol. Adv. Mater.** 16, 044602.
- Krug, H.F. (2015a): Focus on materials challenges for protection - environment and health. **Sci. Technol. Adv. Mater.** 16, 030301.
- Krug, H.F. (2015b): Nanotechnologie versus Nanotoxikologie - Wohin geht die Reise? **Praxis der Naturwissenschaften - Chemie in der Schule** 64, 11-17.
- Patel, P., Krug, H.F. (2015): Perovskites: Is there a reason for concern? **MRS Bulletin** 40, 638-640.

- Rösslein, M., Elliott, J.T., Salit, M., Petersen, E.J., Hirsch, C., Krug, H.F., Wick, P. (2015): Use of Cause-and-Effect Analysis to Design a High-Quality Nanocytotoxicology Assay. **Chem. Res. Toxicol.** 28, 21-30.
- Krug, H.F. (2014): Nanosafety research - are we on the right track? Some thoughts based on a comprehensive literature review. **Angew. Chem. Int. Ed.**, 53, 12304-12319.
- Rösslein, M., Salit, M., Petersen, E.J., Hirsch, C., Krug, H.F., Wick, P. (2014): The use of cause-and-effect analysis to design a high quality nano-cytotoxicology assay. **Chem. Res. Toxicol.** submitted,
- Wick, P., Louw-Gaume, A.E., Kucki, M., Krug, H.F., Kostarelos, K., Fadeel, B., Dawson, K.A., Salvati, A., Vazquez, E., Ballerini, L., Tretiach, M., Benfenati, F., Flahaut, E., Gauthier, L., Prato, M., Bianco, A. (2014): Classification framework for graphene-based materials. **Angew. Chem. Int. Ed.**, 53, 7714-7718.
- Buerki-Thurnherr, T., Xiao, L., Diener, L., Arslan, O., Hirsch, C., Maeder-Althaus, X., Grieder, K., Wampfler, B., Mathur, S., Wick, P., and Krug, H.F. (2013): In vitro mechanistic study towards a better understanding of ZnO nanoparticle toxicity. **Nanotoxicology**, 7, 402-416
- Grafmüller, S., Manser, P., Krug, H.F., Wick, P., von Mandach, U. (2013): Determination of the Transport Rate of Xenobiotics and Nanomaterials Across the Placenta using the ex vivo Human Placental Perfusion Model. **J Vis. Exp.** (76), e50401, doi:10.3791/50401
- Marquardt, C., Kühnel, D., Richter, V., Krug, H.F., Mathes, B., Steinbach, C., and Nau, K. (2013): Latest research results on the effects of nanomaterials on humans and the environment: DaNa - Knowledge Base Nanomaterials. **J. Phys. (Conf. Ser.)** 429, 012060
- Som, C., Nowack, B., Krug, H.F., Wick, P. (2013): Toward the Development of Decision Supporting Tools That Can Be Used for Safe Production and Use of Nanomaterials. **Acc. Chem. Res.** 46, 863-872.
- Tuomela, S., Autio, R., Buerki-Thurnherr, T., Arslan, O., Kunzmann, A., Andersson-Willman, B., Wick, P., Mathur, S., Scheynius, A., Krug, H.F., Fadeel, B., Lahesmaa, R. (2013): Gene expression profiling of immune-competent human cells exposed to engineered zinc oxide or titanium dioxide nanoparticles. **PLoS ONE.** 8, e68415.
- Andersson-Willman, B., Gehrmann, U., Cansu, Z., Buerki-Thurnherr, T., Krug, H.F., Gabrielsson, S., Scheynius, A. (2012): Effects of subtoxic concentrations of TiO₂ and ZnO nanoparticles on human lymphocytes, dendritic cells and exosome production. **Toxicol. Appl. Pharmacol.** 264, 94-103.
- Gasser, M., Wick, P., Clift, M.J., Blank, F., Diener, L., Yan, B., Gehr, P., Krug, H.F., Rothen-Rutishauser, B. (2012): Pulmonary surfactant coating of multi-walled carbon nanotubes (MWCNTs) influences their oxidative and pro-inflammatory potential in vitro. **Part Fibre Toxicol** 9, 17-29.
- Krug, H.F. (2012): Caspase-10 is the key initiator caspase involved in tributyltin-mediated apoptosis in human immune cells. **J. Toxicol.**, 2012: 395482.
- Krug, H.F., Nau, K., Steinbach, C., Klose, R., Förster, A. (2012): Ten years of successful safety research. **chemie report** 9/2012, 4-6.
- Hirsch, C., Rösslein, M., Krug, H.F., and Wick, P. (2011): Nanomaterial cell interactions: are current in vitro tests reliable?

Nanomedicine (Lond), 6: 837 - 847.

Krug, H.F., Wick, P. (2011): Nanotoxicology: an interdisciplinary challenge. **Angew. Chem. Int. Ed Engl.** 50, 1260-1278.

Krug, H.F., Wick, P. (2011): Nanotoxikologie - eine interdisziplinäre Herausforderung. **Angew. Chem.** 123, 1294-1314.

Nowack, B., Krug, H.F., Height, M. (2011): 120 Years of Nanosilver History: Implications for Policy Makers. **Environ Sci Technol** 45, 1177-1183.

Roebben, G., Ramirez-Garcia, S., Hackley, V., Roesslein, M., Klaessig, F., Kestens, V., Lynch, I., Garner, C., Rawle, A., Elder, A., Colvin, V., Kreyling, W., Krug, H.F., Lewicka, Z., McNeil, S., Nel, A., Patri, A., Wick, P., Wiesner, M., Xia, T., Oberdörster, G., Dawson, K. (2011): Interlaboratory comparison of size and surface charge measurements on nanoparticles prior to biological impact assessment. **J. Nanoparticle Res.** 13, 2675-2687.

Wick, P., Malek, A., Manser, P., Meili, D., Maeder-Althaus, X., Diener, L., Diener, P.A., Zisch, A., Krug, H.F., von Mandach, U. (2010): Barrier capacity of human placenta for nanosized materials. **Environ. Health Perspect.** 118, 432-436.

Behra, R., Krug, H.F. (2008): Nanoecotoxicology: Nanoparticles at large. **Nature Nanotech.** 3, 253-254.

Pulskamp, K., Diabaté, S., Krug, H.F. (2007): Carbon nanotubes show no sign of acute toxicity but induce intracellular reactive oxygen species in dependence on contaminants. **Toxicol. Lett.** 168, 58-74.

Wörle-Knirsch, J.M., Pulskamp, K., Krug, H.F. (2006): Oops they did it again! Carbon nanotubes hoax scientists in viability assays. **Nano Lett.** 6, 1261-1268.

**Success Numbers
(January 2020):**

More than 150 papers published

More than 6300 citations, two papers with more than 750 citations each, 16 papers with more than 100 citations each

h-factor = 37

**Reports / Books / Book
Chapters**

Krug, H.F., Kern, K. and Diabaté, S. (2004) Toxikologische Aspekte der Nanotechnologie. Versuch einer Abwägung. Technikfolgenabschätzung. **Theorie und Praxis**, 13 (2), 58-64.

Krug, H.F. (2005) Neues aus der Nanotechnologie: unser Korrespondent berichtet. **UWSF – Z. Umweltchem. Ökotox.** 17 (4), 252.

Krug, H.F., Kern, K., Wörle-Knirsch, J.M. and Diabaté, S. (2005) Ultrafeine Partikel - Gesundheitsrisiko und Anwendungsmöglichkeiten. **internistische praxis**, 45 (4), 443-455.

Krug, H.F., Kern, K. Wörle-Knirsch, J.M. and Diabaté, S. (2006) Toxicity of Nanomaterials – new carbon conformations and metal oxides. In: Impact of Nanomaterials on the Environment, Series title: **Nanotechnology for Life Sciences** (Kumar, C., ed.) Wiley-VCh, Weinheim

Brune H, Ernst H, Grunwald A, Grünwald W, Hofmann H, Janich P, Krug HF, Mayor M, Schmid G, Simon U, Vogel V, Gethmann CF (eds.) **Nanotechnology. Assessment and Perspectives.** Springer, Berlin, 2006

Krug, H.F. (2006) Gibt es Gefährdungen oder Risiken durch Nanopartikel? In: Nanotechnologien nachhaltig gestalten –

Konzepte und Praxis für eine verantwortliche Entwicklung und Anwendung (Markus, P. Kühling, W., Henn, S., eds.) Ev. Akademie Iserlohn, pp. 67-77

Krug, H.F. (2006) Gesundheitliche Aspekte von Nanomaterialien. In: Nanopartikel – Anwendungen und mögliche Risiken (Ministerium für Arbeit und Soziales des Landes Baden-Württemberg, Hrsg.), iku, Dortmund, pp. 38-49.

Krug, H.F. (2006) Kleine und giftig? Interview von Klaus-Dieter Linsmeier. **Spektrum der Wissenschaften**, 10/2006, 64-66.

Krug, H.F. (2006). How dangerous are nanoparticles? **Nanos**, 2/06, 36-37.

Krug, H.F., Diabaté, S. and Wörle-Knirsch, J.M. (2006) Nanonoxen: Aufnahme und Wirkung von synthetischen Nanopartikeln. In: Partikuläre und molekulare Belastungen der Innenraum- und Außenluft. Series title: Schriftenreihe des Institutes für Medizinische Mikrobiologie und Hygiene der Universität zu Lübeck, Band 10, (X. Lübecker Fachtagung für Umwelthygiene) (Keller, R., Senkpiel, K., Samson, R.A. and Hoekstra, E.S. eds.) Schmidt-Römhild Verlag, Lübeck, pp. 233-245.

Krug, H.F. and Wörle-Knirsch, J.M. (2006) 'Cause I'm CNT, not dynamite. **nanotoday**, 1 (4), 48.

Krug, H.F. and Wörle-Knirsch, J.M. (2007) Risikoforschung und toxikologische Bewertung von Nanomaterialien. In: nano – Chancen und Risiken aktueller Technologien (Gazsó, A., Greßler, S. and Schiemer, F., eds.). Springer Wien New York, pp. 101-114

Krug, H.F. (2008) Environmental Aspects of Nanotechnology, Series title: **Nanotechnology**, Vol. 2.

Krug, H.F., Klug, P. (2008) Impact of Nanotechnological Developments on the Environment. In: Nanotechnology: Environmental Aspects. Krug, H.F. (ed.), Vol. 2. Wiley-VCH, Weinheim, pp 291-306

Krug, H.F. (2009) Sicherheit von Nanomaterialien – Umwelt und Gesundheit. In: Nanotechnologie – Grundlagen, Anwendungen, Risiken, Regulierung. Scherzberg, A., Wendorff, J.H. (eds.), De Gruyter Recht, Berlin.

Förster, A., Krüger, P., Krug, H.F., Mathes, B., Steinbach, C., Reuter, M. (2011): 10 Years of Research: Risk Assessment, Human and Environmental Toxicology of Nanomaterials. Krüger, P and Krug, H. F. Frankfurt, DECHEMA.

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Third Party Funding
(bold: particles and
nanomaterials):

BWPLUS BWB 20013 Health effects due to inhalable fine particles from technical combustion devices: in vitro studies on the effects of fine and ultrafine particles in cultivated lung

cells. (Diabaté und Krug, 11/2001 – 03/2004; 240.000,-€)

BWPLUS BWR 24013: Toxikologie (poly)bromierter cyclischer Kohlenwasserstoffe (Flammschutzmittel) – Wirkmechanismen in vitro (Strack und Krug, 09/2004 – 08/2007; 200.000,-€)

DFG KR 2207/1-1: Identifizierung des molekularen Targets bei der Apoptoseinduktion durch Alkylphosphocholine (Krug, 01/2003 – 02/2006; 105.000,-€)

DFG CFN E1.3: Transport of nanoparticles into cells: mechanism and toxicological aspects (Krug, 2004 – 2009; 260.000,-€)

BfR WK-1-1328-182: In vitro exposure of lung cells to aerosol at the air-liquid layer as an alternative for inhalation experiments with animals. (Diabaté, 2004 – 2007; 140.000,-€)

EU 6th FP - IMPART: Improving the understanding of the impact of nanoparticles on human health and the environment (Krug, 02/2005 – 10/2008; 70.000,-€)

BMBF - NanoCare: (Krug, Konsortialleitung und eigener Projektanteil 340.000,-€, 03/2006 – 02/2009)

HGF – Nanotechnology and health - Technological options, risk evaluation and precautionary strategies (lead-managed: ITAS; Krug: 49.000,-€, 04/2006 – 03/2009)

EU 7th FP – NanoImpactNet: Europe-wide Cooperation and coordination in the study of the Health and Environmental Impact of Nanomaterials

EU 7th FP – NANOMMUNE: Comprehensive assessment of hazardous effects of engineered nanomaterials on the immune system; started 1st of September 2008; 485.000,-€

BMBF - DaNa: Acquisition, evaluation and public orientated presentation of societal relevant data and findings for nanomaterials) (Krug, Partner within the German Project Consortium 250.000,-CHF, 08/2009 – 07/2013)

CCMX – VIGO: A new evaluation tool for determination, description and comparison of the biological effects of nanoparticles/nanomaterials (Krug, 900.000,- CHF, 02/2010 – 02/2014)

BMBF – DaNa II: Acquisition, evaluation and public orientated presentation of societal relevant data and findings for nanomaterials) (Krug, Partner within the German Project Consortium 370.000,-CHF, 08/2013 – 07/2017)

EU 7th FP – Graphene Flagship; started 1st of October 2013; 450.000,-€

CCMX – NanoScreen: Concived Evonik in 2016 to be an industrial partner with a contribution of 250.000 € (09/2014 – 08/2019)

BMBF – DaNa III: Acquisition, evaluation and public orientated presentation of societal relevant data and findings for nanomaterials) (Krug - NanoCASE, Partner within the German

Project Consortium 190.000,- € 08/2017 – 12/2019)

OECD Project “Advancing Adverse Outcome Pathway (AOP) Development for Nanomaterial Risk Assessment and Categorisation” (Krug – NanoCASE, Partner for Swiss Delegation, 25.000 CHF, 06/2017 – 02/2020)

BMBF – DaNa 4.0: Data on new, innovative and safe application related materials (Krug - NanoCASE, Partner within the German Project Consortium 185.000,- € 03/2020 – 02/2023)

BMBF – DaMiNaTox: Data Mining on Nanomaterial-Toxicology (Krug – NanoCASE, Initiator and partner within the German Project Consortium 151.000,- € 03/2020 – 02/2023)

(Under)-Graduate education:

22 Diploma students:

Andrea Käfer (1991)
Frank Zauke (1993)
Heike Dieterich (1994)
Tatjana Treiber (1995)
Isabelle Heinisch (1996)
Arnt Luchmann (1996)
Ariane Tomsche (2001)
Claudia Ball (2002)
Carolin Oberle (2002)
Marco Sander (2002)
Christian Nollert (2002)
Young-Moo Choi (2003)
Dirk Blindow (2003)
Gerald Haring (2004)
René Benz (2004)
Karin Pulskamp (2004)
Dariush Etehadieh (2005)
Carsten Schleh (2005)
Anna-Maria Kovacs (2005)
Nicole Jänsch (2006/07)
Sylvia Özdemir (2006/07)
Christoph Wettstein (2008)

20 Ph.D. students:

Uta Brückner-Nieder (1992)
Andrea Käfer (1994)
Thomas Ade (1996)
Frank Zaucke (1997)
Verena Höcke (1998)
Marion Mögel (1998)
Astrid Matzke (1999)
Anne Regelin (2001)
Jörg Trapp (2002)
Ralf Wottrich (2003)
Carolin Oberle (2006)
Susanne Fritsch (2008)
Karin Pulskamp (2008)
Nicole Niemeier (2009)
Katrin Fischer (2009)
Anne-Kathrin Born (2009)
Markus Rottmar (2011)
Michal Gasser (2011)
Stefanie Grafmüller (2015)
Lea von Moos (2016)