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Department of Chemistry and Bioscience
The Faculty of Engineering and Science
Medical Biotechnology
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Research profile

The research of Peter Kristensen is centered on the technical development and application of methods that allow Darwinian evolution of proteins using directed evolution technologies.

The main scientific contributions have more specifically been in the area of recombinant antibodies and methods of isolating such antibodies from large libraries. In addition Peter Kristensen was the first to develop technologies which allow isolation of proteins with improved stabilities from large libraries of mutants. The interest to make technological developments based on recombinant antibodies and for manipulating protein stability and activity, were initiated while Peter Kristensen performed his post doc at the MRC-LMB in Cambridge in the group of Nobel Laureate Sir Greg Winter. However to justify technological development, the technology developed should be able to provide new insight or solve important problems and here we have especially focused attention at finding novel biomarkers which can be used in characterization of important human conditions, such as age related diseases and rare circulating cells in the blood, just to mention the most relevant example. Most recently, the research has involved the use of non-natural amino acids for immobilization and conjugation of recombinant antibodies and proteins of industrial interest and novel biosensors building on recombinant antibody technology.

Qualifications

Chemistry and Biotechnology, PhD, Aarhus University
1992 → 2 Oct 1995
Award Date: 2 Oct 1995

Chemistry and Biotechnology, MSc, Aarhus University
1 Sept 1986 → 30 Jun 1992
Award Date: 1 Jun 1992

Employment

Professor

Professor
Department of Chemistry and Bioscience
The Faculty of Engineering and Science
Aalborg, Denmark
1 Dec 2017 → 31 Dec 4712

Professor

Professor
The Faculty of Engineering and Science
Aalborg Øst, Denmark
1 Dec 2017 → 31 Dec 4712

Medical Biotechnology

The Faculty of Engineering and Science
1 Jan 2024 → present

Neuroboost

The Faculty of Social Sciences and Humanities
Aalborg, Denmark

1 Jan 2023 → present

Associate Professor (MSK)

Department of Engineering, Aarhus University, Gustav Wieds Vej 10C, Aarhus C, DK-8000, Denmark.

1 Jan 2010 → 1 Jan 2017

Associate Professor (MSK)

Department of Molecular Biology and Genetics, Aarhus University, Gustav Wieds Vej 10, Aarhus, Denmark.

1 Jan 2003 → 1 Jan 2010

Senior Scientist

Aarhus Universityhospital, Denmark

1 Jan 2001 → 1 Jan 2002

Research Associate Professor

Department of Molecular Biology and Genetics, Aarhus University, Gustav Wieds Vej 10, Aarhus, Denmark.

1 Jan 2000 → 1 Jan 2001

Research Assistant Professor

Department of Molecular Biology and Genetics, Aarhus University, Gustav Wieds Vej 10, Aarhus, Denmark.

1 Jan 1998 → 1 Jan 2000

Research Scientist

Medical Research Council Centre, Laboratory for Molecular Biology (MRC-LMB)

Cambridge, United Kingdom

1 Jan 1997 → 1 Jan 1998

Post-doctoral Fellow

Medical Research Council Centre, Laboratory for Molecular Biology (MRC-LMB)

Cambridge, United Kingdom

1 Jan 1995 → 1 Jan 1997

Research outputs

Structural trends in antibody-antigen binding interfaces: a computational analysis of 1833 experimentally determined 3D structures

Madsen, A. V., Mejias-Gomez, O., Pedersen, L. E., Morth, J. P., Kristensen, P., Jenkins, T. P. & Goletz, S., Dec 2024, In: Computational and Structural Biotechnology Journal. 23, p. 199-211 13 p.

Protein Binder Toolbox for Studies of Solute Carrier Transporters

Gelová, Z., Ingles-Prieto, A., Bohstedt, T., Frommelt, F., Chi, G., Chang, Y. N., Garcia, J., Wolf, G., Azzollini, L., Tremolada, S., Scacioc, A., Hansen, J. S., Serrano, I., Droce, A., Bernal, J. C., Burgess-Brown, N. A., Carpenter, E. P., Dürr, K. L., Kristensen, P. & Geertsma, E. R. & 6 others, Štefanić, S., Scarabottolo, L., Wiedmer, T., Puetter, V., Sauer, D. B. & Superti-Furga, G., 15 Aug 2024, In: Journal of Molecular Biology. 436, 16, 168665.

Investigation of Fouling in Perfusion Cell Culture Processes Using Alternating Tangential Flow Filtration

Veje, M. H., Jørgensen, M. K., Kristensen, P. & Quirós, M., 11 Jun 2024.

Deep mining of antibody phage-display selections using Oxford Nanopore Technologies and Dual Unique Molecular Identifiers

Mejias-Gomez, O., Braghetto, M., Sørensen, M. K. D., Madsen, A. V., Guiu, L. S., Kristensen, P., Pedersen, L. E. & Goletz, S., 25 May 2024, In: New Biotechnology. 80, p. 56-68 13 p.

Investigation of Fouling in Perfusion Cell Culture Processes Using Alternating Tangential Flow Filtration

Veje, M. H., Quirós, M., Kristensen, P. & Jørgensen, M. K., May 2024, In: Journal of Membrane Science. 701, 122764.

IgG-VHH bispecific fusion antibodies: challenges and opportunities as therapeutic agents

Madsen, A. V., Kristensen, P. & Goletz, S., Apr 2024, In: Expert Opinion on Biological Therapy. 24, 4, p. 203-206 4 p.

Design and engineering of bispecific antibodies: insights and practical considerations

Madsen, A. V., Pedersen, L. E., Kristensen, P. & Goletz, S., 25 Jan 2024, In: Frontiers in Bioengineering and Biotechnology. 12, 1352014.

A window into the human immune system: comprehensive characterization of the complexity of antibody complementary-determining regions in functional antibodies

Mejias-Gomez, O., Madsen, A. V., Skovgaard, K., Pedersen, L. E., Morth, J. P., Jenkins, T. P., Kristensen, P. & Goletz, S., 31 Dec 2023, In: mAbs. 15, 1, 2268255.

Eliminating OFF-Frame Clones in Randomized Gene Libraries: An Improved Split β -Lactamase Enrichment System

Mejias-Gomez, O., Madsen, A. V., Pedersen, L. E., Kristensen, P. & Goletz, S., 25 Jul 2023, In: New Biotechnology. 75, p. 13-20 8 p.

YKL-40 antibody and uses thereof

Kristensen, P. (Inventor), Schumacher, U. (Inventor) & Minor, P. (Inventor), 4 May 2023, IPC No. A61K38/00, A61K39/395, A61P35/00, C07K16/28, C07K16/40, G01N33/574, Patent No. WO2023072405 A1, 29 Oct 2021

VH-Based Mini Q-Body: A Novel Quench-Based Immunosensor

Dong, J., Banwait, B., Ueda, H. & Kristensen, P., 17 Feb 2023, In: Sensors. 23, 4, 2251.

Effect of fouling on recovery of recombinant protein by membrane perfusion filtration

Veje, M. H., Quirós, M., Kristensen, P. & Jørgensen, M. K., 2023.

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Madsen, A. V., Kristensen, P., Buell, A. K. & Goletz, S., 2023, In: mAbs. 15, 1, 2189432 .

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Immobilization-Free Binding and Affinity Characterization of Higher Order Bispecific Antibody Complexes Using Size-Based Microfluidics

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Topoisomerase 1 inhibits MYC promoter activity by inducing G-quadruplex formation

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Semi-rational Engineering of a Promiscuous Fatty Acid Hydratase for Alteration of Regioselectivity

Zhang, Y., Breum, N. M. D., Schubert, S., Hashemi, N., Kyhnau, R., Knauf, M. S., Mathialakan, M., Takeuchi, M., Kishino, S., Ogawa, J., Kristensen, P., Guo, Z. & Eser, B. E., 2022, In: ChemBioChem. 23, 4, p. e202100606 e202100606.

Effects of the engineering of a single binding pocket residue on specificity and regioselectivity of hydratases from *Lactobacillus Acidophilus*

Zhang, Y., Eser, B. E., Kougioumtzoglou, G., Eser, Z., Poborsky, M., Kishino, S., Takeuchi, M., Ogawa, J., Kristensen, P. & Guo, Z., Jul 2021, In: *Biochemical Engineering Journal*. 171, 108006.

Ultra-Early Stroke Diagnostics Implementing Novel Multiparametric Tests for Acute Treatment Decision

Clegg, L.-A., Blauenfeldt, R. A., Bæk, R., Just, J., Kristensen, P., Andersen, G., Drasbek, K. R. & Jørgensen, M. M., 2021.

Fatty acid hydratase for value-added biotransformation: A review

Zhang, Y., Eser, B. E., Kristensen, P. & Guo, Z., Aug 2020, In: *Chinese Journal of Chemical Engineering*. 28, 8, p. 2051-2063 13 p.

Rational Engineering of Hydratase from *Lactobacillus Acidophilus* Reveals Critical Residues Directing Substrate Specificity and Regioselectivity

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A novel excision selection method for isolation of antibodies binding antigens expressed specifically by rare cells in tissue sections

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Holmquist, E. F., Keiding, B. U., Kold-Christensen, R., Salomón, T., Jørgensen, K. A., Kristensen, P., Poulsen, T. B. & Johannsen, M., 2 May 2017, In: *Analytical Chemistry*. 89, 9, p. 5066-5071 6 p.

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Upregulation of Mrps18a in breast cancer identified by selecting phage antibody libraries on breast tissue sections
Sørensen, K. M. J., Meldgaard, T., Melchjorsen, C. J., Fridriksdottir, A. J., Pedersen, H., Petersen, O. W. & Kristensen, P., 5 Jan 2017, In: BMC Cancer. 17, 1, 19.

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Keiding, U., Holmquist, E. F., Jørgensen, K. A., Kristensen, P. & Johannsen, M., 31 Aug 2016.

Fra polyklonale til biosimilære antistoffer

Kristensen, P., Aug 2016, In: BestPractice. Reumatologi.

Raising an antibody specific to breast cancer subpopulations using phage display on tissue sections
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Identification of an unstable 4-hydroxynoneal modification on the 20S proteasome subunit $\alpha 7$ by recombinant antibody technology.
Just, J., Jung, T., Friis, N. A., Lykkemark, S., Drasbek, K., Siboska, G., Grune, T. & Kristensen, P., 1 Dec 2015, In: Free Radical Biology and Medicine. 89, p. 786-792 7 p.

MARK-AGE biomarkers of ageing

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Selection of a breast cancer subpopulation-specific antibody using phage display on tissue sections
Larsen, S. A., Meldgaard, T., Fridriksdottir, A. J., Lykkemark, S., Poulsen, P. C., Overgaard, L. F., Petersen, H. B., Petersen, O. W. & Kristensen, P., 18 Jul 2015, In: Immunologic Research. 62, 3, p. 263-272 10 p.

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Larsen, S. A., Meldgaard, T., Lykkemark, S., Mandrup, O. A. & Kristensen, P., 1 Jan 2015, In: Journal of Cellular and Molecular Medicine. 19, 8, p. 1939-1948 10 p.

Selection strategies for anticancer antibody discovery: Searching off the beaten path

Sánchez-Martín, D., Sørensen, M. D., Lykkemark, S., Sanz, L., Kristensen, P., Ruoslahti, E. & Álvarez-Vallina, L., 1 Jan 2015, In: Trends in Biotechnology. 33, 5, p. 292-301 10 p.

Novel ageing-biomarker discovery using data-intensive technologies

Griffiths, H. R., Augustyniak, E. M., Bennett, S. J., Debacq-Chainiaux, F., Dunston, C. R., Kristensen, P., Melchjorsen, C. J., Navarrete, S. A., Simm, A. & Toussaint, O., 12 Dec 2014, In: Mechanisms of Ageing and Development. 151, p. 114-121 8 p.

Degradation of C-terminal tag sequences on domain antibodies purified from E. coli supernatant

Lykkemark, S., Mandrup, O. A., Friis, N. A. & Kristensen, P., 1 Nov 2014, In: mAbs. 6, 6, p. 1551-1559 9 p.

Expression of single-chain variable fragments fused with the Fc-region of rabbit IgG in Leishmania tarentolae

Jørgensen, M. L., Friis, N. A., Just, J., Madsen, P., Petersen, S. V. & Kristensen, P., 15 Jan 2014, In: Microbial Cell Factories. 13, 1, 9.

Are endothelial outgrowth cells a potential source for future re-vascularization therapy?

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The co-occurrence of mtDNA mutations on different oxidative phosphorylation subunits, not detected by haplogroup analysis, affects human longevity and is population specific

Raule, N., Sevini, F., Li, S., Barbieri, A., Tallaro, F., Lomartire, L., Vianello, D., Montesanto, A., Moilanen, J. S., Bezrukov, V., Blanché, H., Hervonen, A., Christensen, K., Deiana, L., Gonos, E. S., Kirkwood, T. B. L., Kristensen, P., Leon, A., Pelicci, P. G. & Poulain, M. & 18 others, Rea, I. M., Remacle, J., Robine, J. M., Schreiber, S., Sikora, E., Eline Slagboom, P., Spazzafumo, L., Antonietta Stazi, M., Toussaint, O., Vaupel, J. W., Rose, G., Majamaa, K., Perola, M., Johnson, T. E., Bolund, L., Yang, H., Passarino, G. & Franceschi, C., 1 Jan 2014, In: *Aging Cell*. 13, 3, p. 401-407 7 p.

A Novel Heavy Domain Antibody Library with Functionally Optimized Complementarity Determining Regions

Mandrup, O. A., Friis, N. A., Lykkemark, S., Just, J. & Kristensen, P., 8 Oct 2013, In: *PLOS ONE*. 8, 10, e76834.

Raising antibodies against circulating foetal cells from maternal peripheral blood

Sørensen, M. D., Melchjorsen, C. J., Mandrup, O. A. & Kristensen, P., 1 Mar 2013, In: *Prenatal Diagnosis*. 33, 3, p. 284-291 8 p.

How to classify the oldest old according to their health status: A study on 1160 subjects belonging to 552 90+ Italian sibships characterized by familial longevity recruited within the GEHA EU Project

Cevenini, E., Cotichini, R., Stazi, M. A., Taccaceli, V., Scurti, M., Mari, V., Berardelli, M., Passarino, G., Jeune, B., Franceschi, C., Bezrukov, V., Blanché, H., Bolund, L., Christensen, K., Deiana, L., Gonos, E., Hervonen, A., Kirkwood, T. B. L., Kristensen, P. & Leon, A. & 12 others, Pelicci, P. G., Perola, M., Poulain, M., Rea, I. M., Remacle, J., Robine, J. M., Schreiber, S., Sikora, E., Slagboom, P. E., Spazzafumo, L., Toussaint, O. & Vaupel, J. W., 1 Jan 2013, In: *Mechanisms of Ageing and Development*. 134, 11-12, p. 560-569 10 p.

DETECTION OF FETAL CELLS FROM MATERNAL BLOOD

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Selection of antibodies against CD117pos/CD45neg cardiomyocyte progenitor stem cells using phage display

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Identification and analysis of cell-specific biomarkers of breast cancer subpopulations by recombinant antibody selection

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Modular and aggregation resistant Vh antibodies from a phage display library

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Selection of Cell specific antibodies using Antibody Phage Display

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Design, recruitment, logistics, and data management of the GEHA (Genetics of Healthy Ageing) project

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Boisen, L. & Kristensen, P., 1 Dec 2010, *Protein Metabolism and Homeostasis in Aging*. p. 234-244 11 p. (Advances in Experimental Medicine and Biology, Vol. 694).

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Rose, G., Romeo, G., Dato, S., Crocco, P., Bruni, A. C., Hervonen, A., Majamaa, K., Sevini, F., Franceschi, C., Passarino, G., Consortium, G. O. H. A. P., Kristensen, P. & Bolund, L., 14 Oct 2010, In: P L o S One.

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VECTOR FOR SCREENING ANTIBODY

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SELECTION SYSTEM

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A compact phage display human scFv library for selection of antibodies to a wide variety of antigens

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Hormetic modulation of differentiation of normal human epidermal keratinocytes undergoing replicative senescence in vitro
Berge, U., Kristensen, P. & Rattan, S. I. S., 1 Jul 2008, In: *Experimental Gerontology*. 43, 7, p. 658-662 5 p.

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Open Sandwich ELISA Libraries

Kristensen, P. (Inventor), Ueda, H. (Inventor), Kojima, M. (Inventor), Ihara, M. (Inventor) & Kawakami, M. (Inventor), 2008, Patent No. JP2008-032941

Unspecific uptake of M13-type bacteriophage into human endothelial cell lines
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