Maciej Żylicz

Personal information

Family and First name:	Żylicz Maciej
Date and place of birth:	September 21st, 1953, Gdańsk
Nationality:	Polish
Professional Title and Affiliation:	Professor President and Executive Director of the Foundation for Polish Science www.fnp.org.pl
Business Address:	Foundation for Polish Science 20/22 Krasickiego Str. 02-611 Warsaw, Poland
Business Phone:	+48 22 845 95 00 +48 604 499 366

For more information see also: Zylicz M. (2008) How I became a biochemist. *IUBMB life* **60**, 245-248

Degrees

1992 Professor, nomination by the President of the Republic of Poland
1986 DSc Habil in Molecular Biology, Institute of Biochemistry and Biophysics, Polish Academy of Sciences, Warsaw, Poland
1980 PhD in Biochemistry, Medical University of Gdansk, Poland
1977 MSc in Physics, University of Gdansk, Poland (student of physics and biology)

Postdoctoral Training

1982-1984 Department of Cellular, Viral and Molecular Biology, University of Utah, Salt Lake City, Utah, USA, and Department of Biochemistry, Stanford University, Stanford, California, USA
1979-1981 Department of Biochemistry, University of Gdansk, Poland

Professional Employment

2005-present President, Executive Director, Foundation for Polish Science
1999-2018 International Institute of Molecular and Cell Biology in Warsaw (1999-2016 Head, Department of Molecular Biology)
1994-1999 Head, Department of Molecular and Cellular Biology, Faculty of Biotechnology, University of Gdansk, Poland
1991-1994 Head, Department of Molecular Biology, University of Gdansk, Poland
1993-1994 Visiting Professor, University of Utah, Medical Center, Institute of Oncology, Salt Lake City, Utah, USA
1990-1993 Vice President, University of Gdansk, Poland
1988-1991 Associate Professor, Department of Molecular Biology, University of Gdansk, Poland
1981-1988 Assistant Professor, Department of Biochemistry, University of Gdansk, Poland

Other Professional Activities

2010-2015	Advisor on Science of the President of the Republic of Poland
2018-2019	High-Level Search Committee for the election of the ERC successor president (appointed by European Commission)
2010-2014	Member, ERC Identification Committee (appointed by European Commission)
2010-2015	Chair of Selection Committee, Council of the National Science Center, Poland
2008-2010	Panel Chair, Molecular and Structural Biology and Biochemistry (LS1), ERC
2000-2004	Chair of the Biology, Earth Sciences and Environmental Protection Commission, State Committee for Scientific Research, Poland
2000-2001	Chair of Basic Science Commission, State Committee for Scientific Research, Poland
1997-2004	Member of the Biology, Earth Sciences and Environmental Protection Commission, State Committee for Scientific Research, Poland

Membership in Scientific Societies, Organizations, and Panels

- Max Planck Society, Member of Senate (2012-present)
- European Molecular Biology Organization (EMBO), Member
- Polish Academy of Sciences, Member
- German National Academy of Sciences Leopoldina, Member
- Polish Academy of Arts and Sciences, Member
- Academia Europaea, Member
- European Academy of Cancer Research, Member
- American Society of Biochemistry and Molecular Biology, Member
- Advisory Editorial Board, EMBO Journal, EMBO Reports (2004-2008), and IUBMB Life, Member
- EMBO Council (2004-2007), Member
- Selection Committee, EMBO Young Investigator Programme (2001-2003), Member
- European Molecular Biology Conference (2001-2004), Polish delegate
- European Science Foundation Life Science Committee (2003-2005), Polish Delegate
- Selection Committee, Special DFG Programme (2001-2005), Member
- State Committee for Scientific Research (1997-2004), Member

Honors, Prizes and Awards

2019 Award of the Minister of Science and Higher Education for lifetime scientific achievements
2015 Commandor's Cross of the Order of Polonia Restituta
2013 Doctor Honoris Causa, Jagiellonian University
2011 Doctor Honoris Causa, University of Gdansk
2008 Officer's Cross of the Order of Polonia Restituta
2007 Doctor Honoris Causa, University of Wrocław
2002 Prime Minister Award for Scientific Achievements
2001 Marchlewski Award, Committee of Biochemistry and Biophysics, Polish Academy of Sciences
1999 Award of the Foundation for Polish Science
1996, 2007, 2010 Awards for best biochemistry work performed in Polish laboratories, Polish Biochemical Society
1994 Award from Ministry of Education
1993 Heweliusz Prize for Scientific Achievements (awarded by President of Gdansk)
1990 Award from Polish Academy of Sciences
1986 Individual Award for Scientific Achievements, Polish Academy of Sciences

Doctorates

Liberek K, Skowyra D, Osipiuk J, Banecki B, Wojtkowiak D, Jakobkiewicz J, Puzewicz J, Barski P, King F, Bućko-Justyna M, Kudła G, Helwak A, Lipiński L, Szymańska Z, Urbański J, Herok M.

Summary of scientific achievements

Professor Zylicz is distinguished in the field, due to an extensive contribution to understanding the molecular biology of heat shock proteins and identified their activity as molecular chaperones. He isolated the first heat shock proteins and described their biochemical and biophysical properties. Prof. Zylicz is best known for his work on molecular chaperone activity of heat shock proteins in DNA replication. He elucidated the molecular mechanism of action of heat shock proteins in DNA replication initiation, transcription and proteolysis. He has also presented first evidence that heat shock proteins work as molecular chaperones by protecting other proteins from aggregation and dissociating already existing protein aggregates. Moreover, he has shown that elements of the proteolytic machinery possesses the chaperone activity. Recently, he has discovered that molecular chaperones are required for the transcriptional activity of wild-type p53 tumour suppressor protein and that MDM2 oncogene possesses the chaperone activity. Prof. Zylicz presented first evidence that heat shock proteins are also directly involved in gaining new oncogenic functions of mutated p53 tumour suppressor, leading to tumour development, metastasis and acquisition of chemoresistance of breast cancer patients. Recently, he showed that expression of heat shock genes create signature to predict the clinical outcome of breast cancer. For more information about the discovery by prof. Zylicz role of heat shock proteins in neoplastic transformation see: Wawrzynow, B., et al., (2018) *Biochim Biophys Acta Rev Cancer* **1869**, 161-174

Publications

Over 82 publications in primary scientific journals, including two papers published in *Cell*, six in *EMBO J*, six in *Proc Natl Acad Sci USA*, and more than 30 in *J Biol Chem*. These papers were cited more than 7 000 times, average citations per paper 85, papers cited at least 100 times-25.

The papers published in 1980-2019

1. Grzesiuk, E., Zylicz, M., Lipinska,B., Taylor,K. (1980) Phage λ integration protein: synthesis in λ-infected minicells and membrane affinity. *FEBS Lett.* **115**, 281-284.

2. Zylicz, M., Taylor,K. (1981) Interactions between phage λ replication proteins, λDNA and minicell membrane. *Eur. J. Biochem.* **113**, 303-309.

3. Zylicz, M., Nieradko, J., Taylor, K. (1983) *Escherichia coli* dnaJ and dnaK gene products: synthesis in minicells and membrane-affinity. *Biochem. Biophys. Res. Commun.* **110**, 176-180.

4. Tilly, K., McKittrick, N., Zylicz, M., Georgopoulos, C. (1983) The dnaK protein modulates the heat-shock response of *Escherichia coli*. *Cell* **34**, 641-646.

5. Zylicz, M., LeBowitz, J.H., McMacken, R., Georgopoulos, C. (1983) The dnaK protein of *Escherichia coli* possesses an ATPase and autophosphorylating activity and is essential in an *in vitro* DNA replication system. *Proc. Natl. Acad. Sci. USA* **80**, 6431-6435.

6. Zylicz, M., Georgopoulos C. (1983) Properties of the purified *dnaK* gene product of *Escherichia coli.* In "Mechanisms of DNA Replication and Recombination", ed. Alan R. Liss. Inc., pp. 317-326.

7. Zylicz, M., Georgopoulos, C. (1984) Purification and properties of the *Escherichia coli* dnaK replication protein. *J. Biol. Chem.* **259**, 8820-8825.

8. Zylicz, M., Gorska, I., Taylor, K., Georgopoulos, C. (1984) Bacteriophage λ replication proteins: formation of a mixed oligomer and binding to the origin of λ DNA. *Mol. Gen. Genet.* **196**, 401-406.

9. Taylor, K., Gorska, I., Kur J., Lipinska B., Nieradko J., Podhajska A.J., Zylicz, M., (1984) Genetic regulation of the bacteriophage λ DNA replication (a minireview), *Genetica Polonica, Vol. 25, No3.*

10. Tilly K., Chandrasekhar G.N., Zylicz M., Georgopoulos, C. (1985) Relationships between the bacterial heat shock response and bacteriophage lambda growth. *Microbiology,* Published by American Society for Microbiology**, D**., pp. 322-326.

11. Zylicz, M., Yamamoto, T., McKittrick, N., Sell, S., Georgopoulos, C. (1985) Purification and properties of dnaJ replication protein of *Escherichia coli*. *J. Biol. Chem.* **260**, 7591-7598.

12. LeBowitz, J.H., Zylicz, M., Georgopoulos, C., McMacken, R. (1985) Initiation of DNA replication on single-stranded DNA templates catalyzed by purified replication proteins of bacteriophage λ and *Escherichia coli*. *Proc. Natl. Acad. Sci. USA* **82**, 3988-3992.

13. Bardwell J.C.A., Tilly K., Craig E., King J., Zylicz M., Georgopoulos, C. (1986) The nucleotide sequence of the *Escherichia coli* K12 dnaJ^{+} gene. *J. Biol. Chem.* **261,** 1782-1785.

14. Ang D., Chandrasekhar G.N., Zylicz M., Georgopoulos, C. (1986) *Escherichia coli grpE* gene codes for heat shock protein B25.3, essential for both λ DNA replication at all temperatures and host growth at high temperature. *J.Bacteriol*. **167**, p. 25-29.

15. Bochner B.R., Zylicz M., Georgopoulos, C. (1986) *Escherichia coli* DnaK protein possesses a 5'-nucleotidase activity. That is inhibited by AppppA., *J.Bacteriol*. **168**, p. 931-935.

16. Ang D., Chandrasekhar G.N., Johnson C., Zylicz M., Georgopoulos, C. (1987) A genetic and biochemical analysis of the *Escherichia coli grpE* gene and its product.. In "DNA Replication and Recombination" (ed. R. McMacken, T.J., Kelly) Alan R.Liss, Inc. pages 521-632.

17. Yamamoto, T., McIntyre, J., Sell, S.M., Georgopoulos, C., Skowyra, D., Zylicz, M. (1987) Enzymology of the pre-priming steps in λdv DNA replication *in vitro*. *J. Biol. Chem.* **262**, 7996-7999.

18. Zylicz, M., Ang, D., Georgopoulos, C. (1987) The grpE protein of *Escherichia coli*. Purification and properties. *J. Biol. Chem.* **262**, 17437-17442.

19. Skowyra D., Zylicz M. (1987) The heat shock proteins. *Post.Bioch.* **33**, 259-276.

20. Swindle,J., Zylicz,M., Georgopoulos,C., Li,J., Greenblatt,J. (1988) Purification and properties of the NusB protein of *Escherichia coli*. *J. Biol. Chem*. **263**, 10229-10235.

21. Liberek, K., Georgopoulos, C., Zylicz, M. (1988) Role of the *Escherichia coli* DnaK and DnaJ heat shock proteins in the initiation of bacteriophage λDNA replication. *Proc. Natl. Acad. Sci. USA* **85**, 6632-6636.

22. Zylicz, M., Ang, D., Liberek, K., Yamamoto T., Georgopoulos, C. (1988) Initiation of lambda DNA replication reconstituted with purified lamba and *Escherichia coli* replication proteins. *Biochimica et Biophysica Acta* **951**, 344-350.

23. Georgopoulos, C., Tilly, K., Ang, D., Chandrasekhar, G.N., Fayet, O., Spence, J., Ziegelhoffer, T., Liberek, K., Zylicz,M. (1989) The role of the *Escherichia coli* heat shock proteins in bacteriophage lambda growth. In "*Stress-induced proteins*" (ed. M., Parolne, M., Feramisco, S., Lindquist), Alan R. Liss, Inc., N.Y., pp.37-47.

24. Zylicz, M., Ang, D., Liberek, K., Georgopoulos, C. (1989) Initiation of λDNA replication with purified host- and bacteriophage-encoded proteins: the role of the dnaK, dnaJ and grpE heat shock proteins. *EMBO J*. **8**, 1601-1608.

25. Liberek, K., Osipiuk, J., Zylicz, M., Ang, D., Skorko, J., Georgopoulos, C. (1990) Physical interactions between bacteriophage and *Escherichia coli* proteins required for initiation of λDNA replication. *J. Biol. Chem.* **265**, 3022-3029.

26. Georgopoulos, C., Ang, D., Liberek, K., Zylicz, M. (1990) Properties of *Escherichia coli* heat shock proteins and their role in bacteriophage λ growth. In "*Stress Proteins in Biology and Medicine*" (red. C. Georgopoulos, R. Morimoto, A. Tissieres) Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, N.Y., pp. 191-221.

27. Georgopoulos, C., Ang, D., Maddock, A., Raina, S., Lipinska, B., Zylicz, M. (1990) Heat shock response of *Escherichia coli*. In "*The Bacterial Chromosome: Structure and Functional Organization*" (red. M. Riley, K. Drlica) American Society for Microbiology, Washington DC, pp. 405-419.

28. Lipinska B., Zylicz, M., Georgopoulos, C. (1990) The HtrA (DegP) protein, essential for *Escherichia coli* survival at high temperatures, is an endopeptidase. *J. Bacteriol*. **172**, 1791-1797.

29. Sell S.M., Eisen C., Ang D., Zylicz, M., Georgopoulos, C. (1990) Isolation and characterization of dnaJ null mutants of *Escherichia coli*. *J. Bacteriol*. **172**, 4827-4835.

30. Skowyra, D., Georgopoulos, C., Zylicz, M. (1990) The *Escherichia coli* dnaK gene product, the hsp70 homolog, can reactivate heat-inactivated RNA polymerase in an ATP hydrolysis-dependent manner. *Cell* **62**, 939-944.

31. Liberek, K., Marszalek, J., Ang, D., Georgopoulos, C., Zylicz,M. (1991) *Escherichia coli* DnaJ and GrpE heat shock proteins jointly stimulate ATPase activity of DnaK. *Proc. Natl. Acad. Sci. USA.* **88**, 2874-2878.

32. Liberek, K., Skowyra, D., Zylicz, M., Johnson, C., Georgopoulos, C. (1991) The *Escherichia coli* DnaK chaperone, the 70-kDa heat shock protein eukaryotic equivalent, change conformation upon ATP hydrolysis, thus triggering its dissociation from a bound target protein. *J. Biol. Chem.* **266**, 14491-14496.

33. Osipiuk J., Zylicz M. (1991) Role of the *Escherichia coli* grpE heat shock protein in the initiation of bacteriophage λDNA replication. *Acta Biochimica Polonica*, **38**, 191-200.

34. Ang, D., Liberek, K., Skowyra, D., Zylicz, M., Georgopoulos,C. (1991) Biological role and regulation of the universally conserved heat shock proteins. *J. Biol. Chem.* (Minireview) **266**, 24233-24236.

35. Ang, D., Ziegelhoffer, T., Maddock, A., Zeilstra-Ryalls, J., Georgopoulos, C., Fayet, O., Liberek, K., Skowyra, D., Marszalek, J., Osipiuk, J., Wojtkowiak, Sz., Zylicz,M. (1992) The biological role of the universally conserved *E.coli* heat shock proteins. In "*Heat shock*" (red. B. Maresca, S. Lindquist) Springer-Verlag, pp. 58-69.

36. Liberek, K., Galitski, T.P., Zylicz, M., Georgopoulos, C. (1992) The DnaK chaperone modulates the heat shock response of *Escherichia coli* by binding to the σ^{32} transcription factor. *Proc.Natl.Acad.Sci.USA* **89**, 3516-3520.

37. Banecki, B., Zylicz, M., Bertoli, E., Tanfani, F. (1992) Structural and functional relationships in DnaK and DnaK756 heat-shock proteins from *Escherichia coli*. A Fourier transformed infrared study. *J. Biol. Chem.* **267**, 25051-25058.

38. Liberek, K., Skowyra, D., Marszalek, J., Osipiuk, J., Zylicz, M., Ang, D., Maddock, A., Johnson C., Georgopoulos, C. (1992) Bacteriophage λDNA replication and role of the universally conserved dnaK, dnaJ, grpE heat shock proteins. In "*DNA replication: The regulatory Mechanisms*" (red. P. Hughes, E. Fanning and M. Kohiyama) Springer-Verlag, pp.359-368.

39. Osipiuk, J., Georgopoulos, C., Zylicz, M. (1993) Initiation of λDNA replication: The *Escherichia coli* small heat shock proteins, DnaJ and GrpE increase DnaK's affinity for the λP protein. *J. Biol. Chem.* **268**, 4821-4827.

40. Zylicz, M. (1993) The *Escherichia coli* chaperones involved in DNA replication. *Philosophical Transactions of the Royal Society*. (Phil.Trans.R.Soc.Lond.B) **339**, 271-278.

41. Zylicz, M. (1993) The *Escherichia coli* chaperones involved in DNA replication. In "*Molecular Chaperones*" (red. J.J. Ellis, R.A. Laskey oraz G.H. Lorimer) Chapman & Hall, pp. 15-22.

42. Wojtkowiak, D., Georgopoulos, C., Zylicz, M. (1993) Isolation and characterization of ClpX, a new ATP-dependent specificity component of the Clp protease of *Escherichia coli*. *J. Biol. Chem.* **268**, 22609-22617.

43. Ziemienowicz, A., Skowyra, D., Zeilstra-Ryalls, J., Fayet, O., Georgopoulos, C., Zylicz, M. (1993) Both the *Escherichia coli* chaperone systems, GroEL/GroES and DnaK/DnaJ/GrpE, can reactivate heat-treated RNA polymerase: different mechanisms for the same activity. *J. Biol. Chem.* **268**, 25425-25431.

44. Wall, D., Zylicz., M., Georgopoulos, C. (1994) The NH_2-terminal 108 amino acids of the *Escherichia coli* DnaJ protein stimulate the ATPase Acitvity of DnaK and are sufficient for λ replication. *J. Biol. Chem.* **269**, 5446-5451.

45. Georgopoulos, C., Liberek, K., Zylicz, M., Ang, D. (1994) Properties of the heat shock proteins of *Escherichia coli* and the autoregulation of the heat shock response. In " *The Biology of Heat Shock Proteins and Molecular Chaperones*" (ed. R. Morimoto, A. Tissieres, C. Georgopoulos) Cold Spring Harbor Laboratory Press, pp. 209-249.

46. Wall, D., Zylicz, M., Georgopoulos, C. (1995) The conserved G/F motif of the DnaJ chaperone is necessary for the activation of the substrate binding properties of the DnaK chaperone. *J. Biol. Chem.* **270**, 2139-2144.

47. Ziemienowicz, A., Zylicz, M., Floth, Ch., Hubscher, U. (1995) Calf thymus Hsc70 protein protects and reactivates prokaryotic and eukaryotic enzymes. *J. Biol. Chem.* **270**, 15479-15484

48. Wawrzynow, A., Zylicz. M. (1995) Divergent effects of ATP on the binding of the DnaK and DnaJ chaperones to each other, or to their various native and denatured protein substrates. *J. Biol. Chem.* **270**, 19300-19306.

49. Wawrzynow, A., Banecki. B., Wall, D., Liberek, K., Georgopoulos, C., Zylicz, M. (1995) ATP hydrolysis is required for the DnaJ -dependent activation of DnaK chaperone for binding to both native and denatured protein substrates. *J. Biol. Chem.* **270**, 19307-19311.

50. Wawrzynow, A., Wojtkowiak, D., Marszalek, J., Banecki, B., Jonsen, M., Graves, B., Georgopoulos, C., Zylicz, M. (1995) The ClpX heat shock protein of *Escherichia coli*, the ATP-dependent substrate specificity component of the ClpP/ClpX protease, is a novel molecular chaperone. *EMBO J.* **14**, 1867-1877.

51. Blaszczak, A., Zylicz, M., Georgopoulos, C., Liberek, K. (1995) Both ambient temperature and the DnaK chaperone machine modulate the heat shock response in *Escherichia coli* by regulating the switch between σ^{70} and σ^{32} factors assembled with RNA polymerase. *EMBO J.* **14**, 5085-5093.

52. Banecki, B., Zylicz, M. (1996) Real time kinetics of the DnaK/DnaJ/GrpE molecular chaperone machine action. *J. Biol. Chem.* **271**, 6137-6143.

53. Banecki, B., Liberek, K., Wall, D., Wawrzynow, A., Georgopoulos, C., Bertoli, E., Tanfani, F., Zylicz, M. (1996) Structure-function analysis of the zinc finger region of the DnaJ molecular chaperone. *J. Biol. Chem*. **271**, 14840-14848.

54. Wu, B., Wawrzynow, A., Zylicz, M., Georgopoulos, C. (1996) Structure-function analysis of the Escherichia coli GrpE heat shock protein. *EMBO J.* **15**, 4806-4816.

55. Wawrzynow, A., Banecki, B., Zylicz, M. (1996) The Clp ATPases define a novel class of molecular chaperones. *Mol. Microbiol*. **21**, 895-899.

56. Deloche, O., Liberek, K., Zylicz, M., Georgopoulos, C. (1997) Purification and biochemical properties of Saccharomyces cerevisiae Mdj1p, the mitochondrial DnaJ homologue. *J. Biol. Chem.* **272,** 28539-28544.

57. Wawrzynow, A., Zylicz, M. (1997) DnaJ. In "*Guidebook to Molecular Chaperones and Protein-Folding Catalysts*" (ed. M.-J. Gething), A Sambrook & Tooze Publication at Oxford University Press, pp. 95-98.

58. Wawrzynow, A., Zylicz, M. (1997) ClpX. In "*Guidebook to Molecular Chaperones and Protein-Folding Catalysts*" (ed. M.-J. Gething), A Sambrook & Tooze Publication at Oxford University Press, pp. 240-242.

59. Wawrzynow, A., Zylicz, M. (1997) The role of molecular chaperones in DNA replication. In "*Guidebook to Molecular Chaperones and Protein-Folding Catalysts*" (ed. M.-J. Gething), A Sambrook & Tooze Publication at Oxford University Press, pp. 481-489.

60. Zylicz, M., Liberek, K., Wawrzynow, A., Georgopoulos, C. (1998) Formation of the preprimosome protects λ 0 from RNA transcription-dependent proteolysis by ClpP/ClpX. *Proc. Natl. Acad. Sci. USA* **95**, 15259-15263.

61. Gonciarz-Swiatek, M., Wawrzynow, A., Um, S-J., Learn, B.A., McMacken, R., Kelly., W.L., Georgopoulos, C., Sliekers, O., Zylicz, M. (1999) Recognition, targeting and hydrolysis of the λ 0 replication protein by the ClpP/ClpX protease. *J. Biol. Chem***. 274**, 13999-14005.

62. Zylicz, M., Wawrzynow, A., Marszalek, J., Liberek, K., Banecki, B., Konieczny, I., Blaszczak, A., Barski, P., Jakobkiewicz, J., Gonciarz-Swiatek, M., Duchniewicz, M., Puzewicz, J., Krzewska, J. (1999) Role of Chaperones in Replication of Bacteriophage Lambda DNA. In "*Molecular Chaperones and Folding Catalysts*" (ed. B. Bukau) Horwood Academy Publisher, 295-311.

63. Konieczny, I., Zylicz, M., (1999) Role of bacterial chaperones in DNA replication. In "*Genetic Engineering*" Kluwer Academic/Plenum Publishers, New York, Vol. 21, pp. 95-111.

64. Banecki, B., Wawrzynow, A., Puzewicz, J., Georgopoulos, C., Zylicz, M., (2001) Structure–function analysis of the zinc-binding region of the ClpX molecular chaperone. *J. Biol. Chem.* **276**, 18843-18848.

65. Genevaux, P., Wawrzynow, A., Zylicz, M., Georgopoulos, C, Kelley, W.L. (2001) DjlA is a Third DnaK Co-chaperone of Escherichia coli, and Dj1A-mediated Induction of Colanic Acid Capsule Requires Dj1A-DnaK Interaction. *J. Biol. Chem*. **276,** 7906-7912.

66. Zylicz, M., King, F.W., Wawrzynow, A. (2001) Hsp70 interactions with the p53 tumour suppressor protein. *EMBO J.* **20**, 4634-4638.

67. King, F.W., Wawrzynow, A., Hohfeld, J., Zylicz, M. (2001) Co-chaperones Bag-1, Hop and Hsp40 regulate Hsc70 and Hsp90 interactions with wild-type or mutant p53. *EMBO J.* **20**, 6297-6305.

68. Zylicz, M., Wawrzynow, A. (2001) Insights into the function of Hsp70 chaperones. *IUBMB* **51**, 283-287.

69. Jassem, E., Niklinski, J., Rosell, R., Niklinska, W., Jakobkiewicz, J., Monzo, M., Chyczewski, L., Kobierska, G., Skokowski, J., Zylicz, M., Jassem, J. (2001) Types and localisation of p53 gene mutations. A report on 332 non-small cell lung cancer patients. *Lung Cancer* **34**, 47-51.

70. Jassem, E., Ramlau, R., Dziadziuszko, R., Szymanowska, A., Jakobkiewicz, J., Lamperska, K., Kobierska, G., Skokowski, J., Dyszkiewicz, W., Mackiewicz, A., Zylicz, M., Jassem, J. (2002) p53 and p16 gene mutations in non-small cell lung cancer. *Pneumonol. Alergol. Pol.* **70,** 1-2, 64-70.

71. Walerych, D., Kudla, G., Gutkowska, M., Wawrzynow, B., Muller, L., King, F.W., Helwak, A., Boros, J., Zylicz, A., Zylicz, M. (2004) Hsp90 Chaperones Wild-type p53 Tumor Suppressor Protein. *J. Biol. Chem.* **279**, 48836-48845.

72. Dworakowska, D., Jassem, E., Jassem, J., Peters, B., Dziadziuszko, R., Zylicz, M., Jakobkiewicz-Banecka, J., Kobierska-Gulida, G., Szymanowska, A., Skokowski, J., Roessner, A., Schneider-Stock, R., (2004) MDM2 gene amplification: a new independent factor of adverse prognosis in non-small cell lung cancer (NSCLC). *Lung Cancer* **43**, 285-295.

73. Jassem, J, Jassem, E., Jakobkiewicz-Banecka, J., Rzyman, W., Badzio, A., Dziadziuszko, R., Kobierska-Gulinda, G., Szymanowska, A., Skrzypski, M., Zylicz, M. (2004) P53 and K-ras mutations are frequent events in microscopically negative surgical margins from patients with non-small cell lung carcinoma. *Cancer* **100**, 1951-1960.

74. Kudla, G., Lipinski, L., Caffin, F., Helwak, A., and Zylicz, M. (2006) Increased mRNA Production from GC-rich Genes in Mammalian cells. *PLoS Biology* **4**, 933-942.

75. Wawrzynow, B., Zylicz, A., Wallace, M., Hupp, T., Zylicz, M. (2007) MDM2 Chaperones the p53 Tumor Suppressor. *J Biol Chem*. **282**, 32603-32612.

76. Szymanska, Z., Zylicz, M. (2009) Mathematical modeling of heat shock proteins synthesis in response to temprerature change. *J Math Biol*. **58**, 819-844.

77. Narayan, V., Eckert, M., Zylicz, A., Zylicz, M., Ball, L.K. (2009) Cooperative regulation of the IRF-1 tumour suppressor protein by core components of the molecular chaperone machinery. *J Biol Chem* **284**, 25889-25899.

78. Walerych, D., Olszewski, M., Gutkowska, M., Helwak, A., Zylicz, M., Zylicz, A. (2009) Hsp70 molecular chaperones are required to support p53 tumour suppressor activity under stress conditions. *Oncogene* **28**, 4284-4294.

79. Zubrienė, A., Gutkowska, M., Matulienė, J., Chaleckis, R., Michailovienė, V., Voroncova, A., Venclovas, C., Zylicz, A., Zylicz, M., Matulis D. (2010) Thermodynamics of radicicol binding to human Hsp90 alpha and beta isoforms. *Biophys Chem.* **152**, 153-163.

80. Walerych, D., Gutkowska, M., Klejman, M.P., Wawrzynow, B., Tracz, Z., Wiech, M., Zylicz, M., Zylicz, A. (2010) ATP binding to Hsp90 is sufficient for effective chaperoning of p53 protein. *J Biol Chem* **285**, 32020-32028.

81. Wiech, M., Olszewski, M.B., Tracz-Gaszewska, Z., Wawrzynow, B., Zylicz, M., Zylicz, A. (2012) Molecular Mechanism of Mutant p53 Stabilization: The Role of HSP70 and MDM2, *PLOS ONE* **7** (12) e51426

82. Pruszko, M., Milano, E., Forcato, M., Donzelli, S., Ganci, F., Di Agostino, S., De Panfilis, S., Fazi, F., Bates, D.O., Bicciato, S., Zylicz, M., Zylicz, A., Blandino, G., Fontemaggi, G. The mutant p53-ID4 complex controls VEGFA isoforms by recruiting lncRNA MALAT1 (2017) *EMBO Rep.* **18** (8), 1331-1351

83. Tracz-Gaszewska, Z., Klimczak, M., Biecek, P., Herok, M., Kosinski, M., Olszewski, M.B., Czerwińska, P., Wiech, M., Wiznerowicz, M., Zylicz, A, Zylicz, M., Wawrzynow, B. (2017) Molecular chaperones in the acquisition of cancer cell chemoresistance with mutated *TP53* and MDM2 up-regulation. *Oncotarget* **30**, 82123-82143.

84. Wawrzynow, B., Zylicz, A., Zylicz, M. (2018) Chaperoning the guardian of the genome. The two-faced role of molecular chaperones in p53 tumor suppressor action. *Biochim Biophys Acta Rev Cancer* **1869** (2), 161-174

85. Pruszko, M., Milano, E., Zylicz, A., Zylicz, M., Blandino, G., Fontemaggi, G. (2018) Zebrafish as experimental model to establish the contribution of mutant p53 and ID4 to breast cancer angiogenesis *in vivo.* *J Thorac Dis*. **10** (3), 231-233.

86. Donzelli, S., Milano, E., Pruszko, M., Sacconi, A., Masciarelli, S., Iosue, I., Melucci, E., Gallo, E., Terrenato, I., Mottolese, M., Zylicz, M., Zylicz, A., Fazi, F., Blandino, G., Fontemaggi, G. (2018) Expression of ID4 protein in breast cancer cells induces reprogramming of tumour-associated macrophages. *Breast Cancer Res*. **201**, 20 (1), 59-74.

87. Kampinga, H.H., Andreasson, C., Barducci, A., Cheetham, M.E., Cyr, D., Emanuelsson, C., Genevaux, P., Gestwicki, J.E., Goloubinoff, P., Huerta-Cepas, J., Kirstein, J., Liberek, K.,

Mayer, M.P., Nagata, K., Nillegoda, N.B., Pulido, P., Ramos, C., De Los Rios, P., Rospert, S., Rosenzweig, R., Sahi, C., Taipale, M., Tomiczek, B., Ushioda, R., Young, J.C., Zimmermann, R., Zylicz, A., Zylicz, M., Craig, E.A., Marszalek J. (2019) Function, evolution, and structure of J-domain proteins. *Cell Stress Chaperones* **24** (1), 7-15.

88. Olszewski, M.B., Pruszko, M., Snaar-Jagalska, E., Zylicz, A, Zylicz, M. (2019) Diverse and cancer type-specific roles of the p53 R248Q gain-of-function mutation in cancer migration and invasiveness. *Int J Oncol*. **54**(4), 1168-1182.

89. Klimczak, M., Biecek, P., Zylicz, A., Zylicz M. (2019) Heat shock proteins create a signature to predict the clinical outcome in breast cancer. *Sci Rep*. **9** (1), 7507-7522.

.