Resistance to PARP inhibition by DNA damage response alterations in BRCA1/2-deficient tumors

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Curriculum Vitae

Ewa Gogola was born on September 21st, 1988 in Brzesko, Poland. She graduated from I LO in Bochnia in 2007 to start her bachelor studies in Biotechnology at the Jagiellonian University in Krakow. After obtaining her bachelor's degree in 2010, she enrolled into the Biotechnology Master programme (Jagiellonian Univeristy) from which she graduated in 2012. Early in the bachelor studies, she joined the lab of Prof. Jolanta Jura (Jagiellonian University) to investigate the molecular functions of the MCPIP protein, a ribonuclease important for the regulation of stability of transcripts related to cellular inflammatory response and immune homeostasis. She carried out her research on the MCPIP protein throughout her undergraduate studies. In that time, she also undertook an internship at the Polish Academy of Sciences, where she worked with rat model of Parkinson Disease and gained her first experience with *in vivo* models. As a master student, she was awarded two international scholarships, a Socrates Erasmus Scholarship (Ankara University, Turkey) and a CNIO Summer School Scholarship (Madrid, Spain), which piqued her interest in cancer biology and genetically engineered mouse models. That is why in July 2012 she started her PhD research on PARP inhibitor resistance using mouse models of BRCA-associated cancers, under the supervision of Prof. Sven Rottenberg, Prof. Jos Jonkers and Prof. Piet Borst at the Netherlands Cancer Institute (Amsterdam, the Netherlands). During her PhD work she became very interested in how cells cope with toxic genomic lesions and decided to continue the research in the field of DNA damage repair. In January 2019, she joined the lab of Prof. KJ Patel at the MRC Laboratory of Molecular Biology in Cambridge, UK. As a postdoctoral fellow, she is investigating the impact of endogenous DNA damage on tissue homeostasis and aging.

List of publications

Resistance to PARP inhibitors: lessons from preclinical models of BRCA-associated cancer.
Ewa Gogola, Sven Rottenberg, Jos Jonkers.
Ann Rev Cancer Biol. 2019 March;3:235-254. doi: 10.1146/annurev-cancerbio-030617-050232

Selective loss of PARG restores PARylation and counteracts PARP inhibitor-mediated synthetic lethality.
Ewa Gogola, Alexandra A. Duarte*, Julian R. de Ruiter*, Wouter W. Wiegant, Jonas A. Schmid, Roebi de Bruijn, Dominic I. James, Sergi Guerrero Llobet, Daniel J. Vis, Stefano Annunziato, Bream van den Broek, Marco Barazas, Ariena Kersbergen, Marieke van de Ven, Madalena Tarsounas, Donald J. Ogilvie, Marcel van Vugt, Lodewyk F. A. Wessels, Jirina Bartkova, Irina Gromova, Miguel Andújar-Sánchez, Jiri Bartek, Massimo Lopes, Haico van Attikum, Piet Borst, Jos Jonkers, Sven Rottenberg. **equal contribution*
Cancer Cell. 2018 Jun 11;33(6):1078-1093.e12. doi: 10.1016/j.ccell.2018.05.008.

The CST complex mediates end protection at double-strand breaks and promotes PARP inhibitor sensitivity in BRCA1-deficient cells.
Marco Barazas, Stefano Annunziato, Stephen J. Pettitt, Inge de Krijger, Hind Ghezraoui, Stefan J. Roobol, Catrin Lutz, Jessica Frankum, Fei Fei Song, Rachel Brough, Bastiaan Evers, Ewa Gogola, Jinhyuk Bhin, Marieke van de Ven, Dik C. van Gent, Jacqueline J.L. Jacobs, Ross Chapman, Christopher J. Lord, Jos Jonkers, Sven Rottenberg.
Cell Rep. 2018 May 15;23(7):2107-2118. doi: 10.1016/j.celrep.2018.04.046.

Multifaceted impact of microRNA 493-5p on genome-stabilizing pathways induces platinum and PARP inhibitor resistance in BRCA2-mutated carcinomas.
Khyati Meghani, Walker Fuch, Alexandre Detappe, Pascal Drané, Ewa Gogola, Sven Rottenberg, Jos Jonkers, Ursula Matulonis, Elizabeth M. Swisher, Panagiotis A. Konstantinopoulos, Dipanjan Chowdhury.
Cell Rep. 2018 Apr 3;23(1):100-111. doi: 10.1016/j.celrep.2018.03.038.

BRCA-deficient mouse mammary tumor organoids to study cancer-drug resistance.
Alexandra A. Duarte*, Ewa Gogola*, Norman Sachs, Marco Barazas, Stefano Annunziato, Julian R. de Ruiter, Arno Velds, Sohvi Blatter, Julia M. Houthuijzen, Marieke van de Ven, Hans Clevers, Piet Borst, Jos Jonkers, Sven Rottenberg. **equal contribution*
Nat Methods. 2018 Feb;15(2):134-140. doi: 10.1038/nmeth.4535.

A living biobank of breast cancer organoids captures disease heterogeneity.
Norman Sachs*, Joep de Ligt*, Oded Kopper*, Ewa Gogola, Gergana Bounova, Fleur Weeber, Anjali Vanita Balgobind, Karin Wind, Ana Gracanin, Harry Begthel, Jeroen Korving, Ruben van Boxtel, Alexandra A. Duarte, Daphne Lelieveld, Arne van Hoeck, Robert F. Ernst, Francis Blokzijl, Isaac J. Nijman, Marlous Hoogstraat, Marieke van de Ven, David A. Egan, Vittoria Zinzalla, Jurgen Moll, Sylvia Fernandez Boj, Emile E. Voest, Lodewyk Wessels, Paul J. van Diest, Sven Rottenberg, Robert G. J. Vries, Edwin Cuppen, Hans Clevers **equal contribution*
Cell. 2018 Jan 11;172(1-2):373-386.e10. doi: 10.1016/j.cell.2017.11.010.

EZH2 promotes degradation of stalled replication forks by recruiting MUS81 through histone H3 trimethylation.
Beatrice Rondinelli, Ewa Gogola, Hatice Yücel, Alexandra A. Duarte, Marieke van de Ven, Roxanne van der Sluijs, Panagiotis A. Konstantinopoulos, Jos Jonkers, Raphaël Ceccaldi, Sven Rottenberg, Alan D. D'Andrea
Nat Cell Biol. 2017 Nov;19(11):1371-1378. doi: 10.1038/ncb3626.

Progression through mitosis promotes PARP inhibitor-induced cytotoxicity in homologous recombination-deficient cancer cells.
Pepijn M. Schoonen, Francien Talens, Colin Stok, Ewa Gogola, Anne Margriet Heijink, Peter Bouwman, Floris Foijer, Madalena Tarsounas, Sohvi Blatter, Jos Jonkers, Sven Rottenberg, Marcel A. T. M. van Vugt
Nat Commun. 2017 Jul 17;8:15981. doi: 10.1038/ncomms15981.

TRIM28 is an Epigenetic Barrier to Induced Pluripotent Stem Cell Reprogramming.
Denise C. Miles, Nienke A. de Vries, Santiago Gisler, Cor Lieftink, Waseem Akhtar, Ewa Gogola, Inka Pawlitzky, Danielle Hulsman, Ellen Tanger, Martijn Koppens, Roderick L. Beijersbergen, Maarten van Lohuizen
Stem Cells. 2017 Jan;35(1):147-157. doi: 10.1002/stem.2453.

Replication fork stability confers chemoresistance in BRCA-deficient cells.
Arnab Ray Chaudhuri*, Elsa Callen*, Xia Ding, Ewa Gogola, Alexandra A. Duarte, Ji-Eun Lee, Nancy Wong, Vanessa Lafarga, Jennifer A. Calvo, Nicholas J. Panzarino, Sam John, Amanda Day, Anna Vidal Crespo, Binghui Shen, Linda M. Starnes, Julian R. de Ruiter, Jeremy A. Daniel, Panagiotis A. Konstantinopoulos, David Cortez, Sharon B. Cantor, Oscar Fernandez-Capetillo, Kai Ge, Jos Jonkers, Sven Rottenberg, Shyam K. Sharan, André Nussenzweig **equal contribution*
Nature. 2016 Jul 21;535(7612):382-7. doi: 10.1038/nature18325.

Selective resistance to the PARP inhibitor olaparib in a mouse model for BRCA1-deficient metaplastic breast cancer.

Linda Henneman, Martine H. van Miltenburg, Ewa M. Michalak, Tanya M. Braumuller, Janneke E. Jaspers, Anne Paulien Drenth, Renske de Korte-Grimmerink, Ewa Gogola, Karoly Szuhai, Andreas Schlicker, Rahmen Bin Ali, Colin Pritchard, Ivo J. Huijbers, Anton Berns, Sven Rottenberg, Jos Jonkers

Proc Natl Acad Sci U S A. 2015 Jul 7;112(27):8409-14. doi: 10.1073/pnas.1500223112.

REV7 counteracts DNA double-strand break resection and affects PARP inhibition.

Guotai Xu, J. Ross Chapman*, Inger Brandsma*, Jingsong Yuan, Martin Mistrik, Peter Bouwman, Jirina Bartkova, Ewa Gogola, Daniël Warmerdam, Marco Barazas, Janneke E. Jaspers, Kenji Watanabe, Mark Pieterse, Ariena Kersbergen, Wendy Sol, Patrick H. N. Celie, Philip C. Schouten, Bram van den Broek, Ahmed Salman, Marja Nieuwland, Iris de Rink, Jorma de Ronde, Kees Jalink, Simon J. Boulton, Junjie Chen, Dik C. van Gent, Jiri Bartek, Jos Jonkers, Piet Borst, Sven Rottenberg **equal contribution*

Nature. 2015 May 28;521(7553):541-544. doi: 10.1038/nature14328.