



# ACCADEMIA MEDICA DI ROMA

mercoledì 3 aprile 2024, ore 16.00

Auditorium Prima Clinica Medica

Policlinico Umberto I, viale del Policlinico 155, Roma

La conferenza potrà essere seguita in presenza presso la sede sopra descritta oppure in streaming sulla piattaforma Zoom utilizzando il seguente link

<https://uniroma1.zoom.us/j/92312414393?pwd=cDM2bTZ3VldoWEFjSnNjNjR6bmtJdz09>

(Meeting ID: 923 1241 4393; Passcode: accademia)

## Peter D. Katsikis

Professor and Head, Department of Immunology,  
Erasmus MC, University Medical Center Rotterdam

*Parlerà sul tema:*

**“Overcoming the obstacles faced by neoantigen  
cancer vaccines”**

*La S.V. è invitata ad intervenire.*

L'ACCADEMICO SEGRETARIO  
ANTONIO MUSARO'

IL PRESIDENTE  
VINCENZO BARNABA

**Il certificato di partecipazione verrà rilasciato solo in presenza**

## **“Overcoming the obstacles faced by neoantigen cancer vaccines”**

**Peter D. Katsikis**

**Department of Immunology, Erasmus University Medical Center, Rotterdam, The Netherlands**

Cancer cells arise because of DNA mutations that alter their survival and/or proliferation. These mutations, however, have the potential to generate altered or entirely new protein products that the immune system sees as foreign. These altered or new proteins are called neoantigens and can serve as targets of the immune system. Therapeutic cancer vaccines that stimulate neoantigen-specific T cells are expected to improve the efficacy of immune checkpoint therapies in cancer. However, a number of obstacles still remain to be overcome before we have vaccines that induce potent neoantigen-specific T cell immunity that can provide clinical benefit in cancer. Our laboratory has been addressing some of these obstacles and is trying to find solutions for potent neoantigen vaccines that provide protection against established tumors.

# PETER D. KATSIKIS

## SHORT CURRICULUM VITAE

Peter D. Katsikis M.D., Ph.D.,  
Professor and Head,  
Department of Immunology, Erasmus University Medical Center  
Office Na-1218, Wytemaweg 80  
3015 CN Rotterdam, The Netherlands  
Tel: +31-107044188 (Administrative Assistant)  
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### EMPLOYMENT:

- 2014-present: Professor and Head, Department of Immunology,  
Erasmus University Medical Center  
Rotterdam, The Netherlands
- 2004-2015: Professor-Tenured, Department of Microbiology & Immunology  
Drexel University College of Medicine, Philadelphia, PA 19129
- 1999-2004: Associate Professor, Department of Microbiology & Immunology  
Drexel University College of Medicine, Philadelphia, PA 19129
- 1997-1999: Assistant Professor, Department of Microbiology & Immunology  
Institute for Cellular Therapeutics, Allegheny University of Health Sciences  
Philadelphia, PA 19102
- 1994-1997: Postdoctoral Research Scholar, Herzenberg Laboratory, Department of Genetics,  
Stanford University School of Medicine, Stanford, CA 94305
- 1990-1994: Postdoctoral Research Associate, Kennedy Institute of Rheumatology Division,  
Imperial College, London, U.K.

### EDUCATION AND POSTGRADUATE TRAINING:

- 1990: PhD, Laboratory of Clinical Immunology, Department of Internal Medicine/Rheumatology,  
University of Ioannina Medical School, Ioannina, Greece.
- 1988-1989: Part of PhD research was conducted as Research Fellow in the Department of Immunology,  
University of Brest Medical School, Brest, France.
- 1985-1986: Residency in Internal Medicine, Department of Internal Medicine,  
General Hospital of Arta, Arta, Greece.
- 1985: M.D. Aristotelian University Medical School,  
Thessaloniki, Greece.

### GRANT SUPPORT

Parentheses after total costs indicate support to Katsikis laboratory. No parenthesis, indicates all funds to Katsikis laboratory.

#### Funded (Current):

- 1) EU Horizon 2020 Project 779295 Title: Immunome project consortium for AutoInflammatory Disorders (ImmunAID). Principle Investigator/Co-ordinator Vassilis Soumelis (Institut Curie, Paris)  
Co-PI: Peter D. Katsikis; Duration: 2018-24; Total costs: € 15,835,851 (Katsikis: € 2,600,620)
- 2) Health Holland AidsFonds HIV Cure, Title: ICD-ICK4HIVCure  
Principle Investigator: Charles Bouchier (Erasmus MC)  
Co-PI: Peter D. Katsikis; Duration: 2019-22; Total costs: € 857,000 (Katsikis: € 242,000)
- 3) KWF Project Number 12837 – (Dutch Cancer Society), Title: Improving Checkpoint Blockade Therapy with Highly Immunogenic Personalized Neoepitope Vaccines  
Principle Investigator: Peter D. Katsikis; Duration: 2020-24; Total costs: € 536,153
- 4) Health Holland TKI-LSH Project: LSHM20056-H010, Title: COVID-19 immunity and inflammation  
Principle Investigator: Peter D. Katsikis, Duration: 2020-21; Total costs: € 543.140
- 5) Health Holland TKI-LSH Project: EMCLSH20003

Title: Creating a low risk strategy for rapid and efficient engraftment after hematopoietic stem cell transplantation. Principle Investigator: Stefan Erkeland (Erasmus MC)  
Co-PI: Peter D. Katsikis; Duration: 2020-24; Total costs: € 1,031,314 (Katsikis: € 50,000)

- 6) IMSUT Joint Research Project FY 2022: Project Number New-2022-K3003  
Title: Human Systems Immunology of vaccine and immunotherapy  
Principal Investigator: Peter Katsikis; IMSUT Host Researcher: Ken J. ISHII  
Duration: 2022-23; Total costs: € 12,229 (¥ 1,610,000)
- 7) Health Holland TKI-LSH Project: EMCLSH22008  
Title: Eliminating HIV-infected cells with bi-specific reagents  
Principle Investigator: Yvonne Mueller (Erasmus MC)  
Co-PI: Peter D. Katsikis; Duration: 2022-25; Total costs: € 993.952 (Katsikis: € 50,000)
- 8) IMSUT Joint Research Project FY 2023: Project Number New-2023  
Title: Human Systems Immunology of vaccine and immunotherapy  
Principal Investigator: Peter Katsikis; IMSUT Host Researcher: Ken J. ISHII  
Duration: 2023-24; Total costs: € 12,229 (¥ 1,610,000)

#### **Funded Completed:**

Multiple completed grants as Principle investigator (6 R01 grants from NIH, 1 from Worldwide Cancer Research, 1 Drexel University Synergy Grants, 1 from Drexel University Tobacco Formula Funds and 1 from PA State 2004 Health Research Formula Fund) and as co-Investigator (2 R21 grants from NIH, 1 from Drexelmed CURE Grant and 2 from Scleroderma Foundation).

#### **EDITORIAL SERVICE**

- 1) 2007-2010: Associate Editor, Journal of Immunology, 2) 2010-2014: Section Editor, Journal of Immunology
- 3) 2010-present: Associate Editor, Frontiers in Immunology, 4) 2014-present: Review Editor, Frontiers in Genetics (Editorial Board of Non-Coding RNA), 5) 2014-present: Review Editor, Frontiers in Molecular Biosciences

#### **PUBLICATIONS** (select from 133 publications)

- 1) Elliott MJ, Maini RN, Feldmann M, Long-Fox A, Charles P, Katsikis P, Brennan FM, Walker J, Bijl H, Ghrayeb J, Woody J: Treatment of rheumatoid arthritis with chimeric monoclonal antibodies to TNF $\alpha$ . Safety, clinical efficacy, and regulation of the acute-phase response. *Arth. Rheum.* 36:1681-1690, 1993
- 2) Katsikis PD, Chu CQ, Brennan FM, Maini RN, Feldmann M: Immunoregulatory role of Interleukin 10 (IL-10) in rheumatoid arthritis. *J. Exp. Med.* 179:1517-1527, 1994
- 3) Katsikis PD, Wunderlich ES, Smith CA, Herzenberg LA, Herzenberg LA: Fas antigen stimulation induces marked apoptosis of T lymphocytes in HIV infected individuals. *J. Exp. Med.* 181:2029-2036, 1995
- 4) Blankenberg FG, Katsikis PD, Storrs RW, Beaulieu C, Spielman D, Chen JY, Naumovski L, Tait JF: Quantitative analysis of apoptotic cell death using proton nuclear magnetic resonance spectroscopy. *Blood* 89:3378-3386, 1997
- 5) Mueller YM, De Rosa S, Hutton JA, Witek J, Roederer M, Altman JD, Katsikis PD: Increased CD95/Fas induced apoptosis of HIV-specific CD8<sup>+</sup> T cells. *Immunity* 15:1-20, 2001
- 6) Halstead SE, Mueller YM, Altman JD, Katsikis PD: In vivo stimulation of CD137 broadens primary antiviral CD8<sup>+</sup> T cell responses. *Nature Immunol.* 3:536-41, 2002
- 7) Mueller YM, Bojczuk P, Halstead ES, Kim AH, Witek J, Altman JD, Katsikis PD: IL-15 enhances survival and function of HIV-specific CD8<sup>+</sup> T cells. *Blood* 101:1024-9, 2003
- 8) Borowski AB, Boesteanu AC, Mueller YM, Carafides C, Altman JD, Jennings SR, Katsikis PD: Memory CD8<sup>+</sup> T cells require CD28 costimulation. *J. Immunol.* 179:6494-6503, 2007
- 9) Bucks CM, Norton JA, Boesteanu AC, Mueller YM, Katsikis PD: Chronic antigen stimulation alone is sufficient to drive CD8<sup>+</sup> T cell exhaustion. *J. Immunol* 182:6697-6708, 2009.
- 10) Katsikis PD, Mueller YM, Villinger F: The cytokine network of acute HIV infection: a promising target for vaccines and therapy to reduce viral set-point? *PLOS Pathogens* 7: e1002055, 2011
- 11) Gracias DT, Stelekati E, Hope JL, Boesteanu AC, Fraietta JA, Doering T, Norton J, Mueller YM, Wherry EJ, Turner M, Katsikis PD: MicroRNA-155 controls CD8<sup>+</sup> T cell responses by regulating interferon signaling. *Nat Immunol.* 14:593-602, 2013

- 12) Fraietta JA, Mueller YM, Yang G, Boesteanu AC, Gracias DT, Do DH, Hope JL, Kathuria N, McGettigan SE, Lewis MG, Giavedoni LD, Jacobson JM, Katsikis PD: Type I interferon upregulates Bak and contributes to T cell loss during human immunodeficiency virus (HIV) infection. *PLOS Pathogens* 9: e1003658, 2013
- 13) Stelekati E, Shin H, Doering TA, Dolfi DV, Zeigler CG, Beiting D, Liboon J, Wolski D, Katsikis PD, Shen H, Roos DS, W. Haining WN, Lauer G, Wherry EJ: Bystander Chronic Infection Negatively Impacts Development of CD8 T Cell Memory. *Immunity* 40:801-13, 2014
- 14) Johnson BM, Fraietta JA, Gracias DT, Hope JL, Stairiker CJ, Patel PR, Mueller YM, McHugh MD, Jablonowski, LJ, Wheatley MA, Katsikis PD: Acute exposure to ZnO nanoparticles induces autophagic immune cell death. *Nanotoxicology* 9:737-48, 2015
- 15) Gracias DT, Boesteanu AC, Fraietta JA, Hope JL, Carey AJ, Mueller YM, Kawalekar OU, Fike A, June CH, Katsikis PD: Phosphoinositide 3-Kinases p110 $\delta$  isoform regulates CD8<sup>+</sup> T cell responses during acute viral and intracellular bacterial infections. *J. Immunol.* 196:1186-98, 2016
- 16) Carey AJ, Gracias DT, Thayer JL, Boesteanu AC, Kumova OK, Mueller YM, Hope JL, Fraietta JA, van Zessen DBH, Katsikis PD: Impaired CD8<sup>+</sup> T cell responses to Influenza infection in neonatal mice are due to the immature TCR repertoire. *J. Immunol.* 196:2602-13, 2016
- 17) Artlett CA, Sassi-Gaha S, Hope JL, Feghali-Bostwick CA, Katsikis PD: Mir-155 is over expressed in systemic sclerosis fibroblasts and is required for NLRP3 inflammasome-mediated collagen synthesis during fibrosis. *Arthritis Research & Therapy* 19:144-152, 2017
- 18) Stelekati E, Chen Z, Manne S, Kurachi M, Ali M, Lewy K, Cai Z, Hope JL, Fike A, Katsikis PD, Wherry EJ: Long-term persistence of exhausted CD8 T cells in chronic infection regulated by microRNA-155 *Cell Rep.* 23:2142-2156, 2018
- 19) Hancock A, Stairiker CJ, Boesteanu AC, Monzón-Casanova E, Lukasiak S, Mueller YM, Stubbs A, Garcia-Sastre A, Turner M, Katsikis PD: Transcriptome analysis of infected and bystander type 2 alveolar epithelial cells during influenza A virus infection reveals in vivo Wnt pathway downregulation. *J. Virol.* 92(21). pii: e01325-18, 2018
- 20) Zhao M, Kiernan CH, Stairiker CJ, Leon LG, Meurs M, Brouwers-Haspels I, Boers R, Boers J, Gribnau J, IJcken WFJ, Bindels EM, Hoogenboezem RM, Erkeland SJ, Mueller YM, Katsikis PD: Rapid in vitro generation of bona fide exhausted CD8<sup>+</sup> T cells is accompanied by Tcf7 promotor methylation. *PLoS Pathog.* 16(6): e1008555, 2020
- 21) Hope JL, Zhao M, Stairiker CJ, Kiernan CH, Carey AJ, Mueller YM, van Meurs M, Brouwers-Haspels I, Otero DC, Bae EA, Faso HA, Maas A, de Looper H, Fortina PM, Rigoutsos I, Bradley LM, Erkeland SJ, Katsikis PD: "MicroRNA-139 Expression is Dispensable for the Generation of Influenza-Specific CD8<sup>+</sup> T cell Responses". *J Immunol.* 208:603-617, 2022
- 22) Mueller YM, Schrama TJ, Ruijten R, Schreurs MWJ, Grashof DGB, van de Werken HJG, Lasinio GJ, Alvarez de la Sierra D, Kiernan CH, Castro Eiro MD, van Meurs M, Brouwers-Haspels I, Zhao M, Li L, de Wit H, Ouzounis CA, Wilmsen MEP, Alofs TM, Laport DA, van Wees T, Kraker G, Jaimes MC, Van Bockstael S, Hernández-González M, Rokx C, Rijnders BJA, Pujol-Borrell R, Katsikis PD: Stratification of hospitalized COVID-19 patients into clinical severity progression groups by immuno-phenotyping and machine learning. *Nat Commun.* 13: 915, 2022
- 23) Petkau G, Mitchell TJ, Chakraborty K, Bell SE, D'Angeli V, Matheson L, Turner DJ, Saveliev A, Gizlenci O, Salerno F, Katsikis PD, and Turner M: The timing of differentiation and potency of CD8 effector function is set by RNA binding proteins. *Nat Commun.* 13: 2274, 2022
- 24) Zhao M, Li L, Kiernan CH, Castro Eiro MD, Dammeijer F, van Meurs M, Brouwers-Haspels I, Wilmsen MEP, Grashof DGB, van de Werken HJG, Hendriks RW, Aerts JG, Mueller YM, Katsikis PD: Overcoming immune checkpoint blockade resistance in solid tumors with intermittent ITK inhibition *Scientific Reports* 13:15678, 2023
- 25) Li L, Zhao M, Kiernan CH, Castro Eiro MD, van Meurs M, Brouwers-Haspels I, Wilmsen MEP, Grashof DGB, van de Werken HJG, Hendriks RW, Mueller YM, Katsikis PD: Ibrutinib directly reduces CD8<sup>+</sup>T cell exhaustion independent of BTK *Frontiers in Immunology* 14:1201415, 2023 | <https://doi.org/10.3389/fimmu.2023.1201415>
- 26) Castro Eiro MD, Hioki K, Li L, Wilmsen MEP, Kiernan CH, Brouwers-Haspels I, van Meurs M, Zhao M, de Wit H, Grashof DGB, van de Werken HJG, Mueller YM, Schliehe C, Temizoz B, Kobiyama K, Ishii KJ, Katsikis PD: TLR9 plus STING agonist adjuvant combination induces potent neopeptide T cell immunity and improves immune checkpoint blockade efficacy in a tumor model. *Journal of Immunology* 212:455-465, 2024
- 27) Katsikis PD, Ishii KJ, Schliehe C: Challenges in developing personalized neoantigen cancer vaccines *Nat Rev Immunol*, 24:213–227, 2024