Professor. Tony Velkov
Pharmacology
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Biography

One of the most outstanding accomplishments of modern medicine was the development of antibiotics for treatment of bacterial infections that were widely fatal. However, due to a marked decline in discovery of new antibiotics over the past few decades, the world is now facing an enormous threat from the emergence of bacteria that are resistant to all available antibiotics. A/Prof Velkov is a world leading expert in several aspects of antibiotic pharmacology, including their mode of action, chemistry, structure-activity relationships and toxicity. His advocacy for commercialization and stewardship of antibiotics is commendable, together with Professor Jian Li he established and co-leads The Victorian Antimicrobial Discovery Group; and co-founded the Global Initiative on Antimicrobial Computational Pharmacology. He has extensive international industry experience, having been awarded two NHMRC industry fellowships and a REDI MPTConnect Industry Fellowship. He was recognised by the NHMRC with Excellence Awards in 2011 and again in 2015. The significant impact of his anti-infective research was highlighted by the NHMRC through a 'Ten of the Best' award for his novel lipopeptide discovery project grant. He has a unique setup in his laboratory for developing novel lipopeptide and depsi-pepetide antibiotics targeting multi-resistant superbugs (from drug design, chemistry synthesis, in vitro models to in vivo safety and efficacy evaluations). A/Prof Velkov has published >240 papers on antibiotic drug discovery, PK/PD, pharmacology and resistance. He is a key opinion leader in my field ranked first among 14,673 experts in polymyxin chemistry research globally expertscape.com/ex/polymyxin. A/Velkov serves on Editorial boards (Br J Pharmacol, Molecules, Vaccine, J Adv Science) and a regular invited reviewer for prominent international journals (e.g. Nat Med). He is a serving member of several professional societies, including American Society for Microbiology, Australian Society for Biochemistry and Molecular Biology, Australian Pharmaceutical Science Association, Australian Thoracic Society. A/Prof Velkov serves as a regular reviewer of grant applications for various government bodies including the National Institute of Health (US), National Health and Medical Research Council, Australian Research Council, New Zealand Marsden Fund, the European Society of Clinical Microbiology and Infectious Diseases, Wellcome Trust (UK), Research Councils UK (RCUK), the Netherlands Organisation for Scientific Research, French National Research Agency and Israel Science Foundation. His internationally leading research is underpinned by an exceptional track record in advancing projects to clinical development and commercialisation of intellectual property through his extensive academic-industry partnerships. A/Prof Velkov's international leadership is also demonstrated by significant continuous funding support from major Australian and international granting bodies. Since 2004 he has been awarded 25 grants (14 as lead) by the USA NIH ($17M, 6 R01 projects), USA Department of Defence ($2M), and Australian NHMRC/ARC ($8.2M). As NIH funds are extremely competitive, the multiple R01 awards to Australian researcher are an exceptional accomplishment and have immensely enhanced Australia's reputation and international standing. His innovative research is encompassed by complementary and integrated streams that encompass the 'lab bench to bedside' doctrine and efficiently translate his multidisciplinary research to clinical practice and pharmaceutical products.

Employment

Professor (Research)
Pharmacology
MONASH UNIVERSITY
13 Jun 2022 → present

Editor, British Journal of Pharmacology
John Wiley & Sons Limited (United Kingdom)
Oxford, United Kingdom

Adjunct, Principle Research Fellow, Department of Biochemistry and Pharmnacology
University of Melbourne
Parkville, Australia

Research outputs

Model-informed dose optimisation of polymyxin-rifampicin combination therapy against multidrug-resistant *Acinetobacter baumannii*

Zhao, J., Zhu, Y., Han, M-L., Lu, J., Yu, H. H., Wickremasinghe, H., Zhou, Q. T., Bergen, P., Rao, G., Velkov, T., Lin, Y-W. & Li, J., Sept 2023, In: International Journal of Antimicrobial Agents. 62, 3, 13 p., 106902.

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Velkov, T., Horne, H. J., Laguerre, A. K., Jones, E. D., Scanlon, M. & Porter, C. J., 2007, In: Chemistry and Biology. 14, 4, p. 453 - 465 13 p.

Generation of mutant leukaemia inhibitory factor (LIF)-IgG heavy chain fusion proteins as bivalent antagonists of LIF
Jazayeri, J., De Weerd, N. A., Raye, W. S., Velkov, T., Santos, L. L., Taylor, D. & Carroll, G. J., 2007, In: Journal of Immunological Methods. 323, 1, p. 1 - 10 10 p.

Probing the Flexibility of the DsbA Oxidoreductase from Vibrio cholerae-a 15N - 1H Heteronuclear NMR Relaxation Analysis of Oxidized and Reduced Forms of DsbA
Horne, H. J., d'Auvergne, E. J., Coles, M., Velkov, T., Chin, Y., Charman, W. N., Prankerd, R. J., Gooley, P. & Scanlon, M. , 2007, In: Journal of Molecular Biology. 371, 3, p. 703 - 716 14 p.

An improved purification procedure for cyclosporin synthetase
Velkov, T., Singaretnam, L. G. & Lawen, A., 2006, In: Protein Expression and Purification. 45, 2, p. 275 - 287 13 p.

An improved method for the purification of rat liver-type fatty acid binding protein from Escherichia coli
Velkov, T., Chuang, S., Prankerd, R. J., Sakellaris, H. H., Porter, C. J. H. & Scanlon, M. J., 2005, In: Protein Expression and Purification. 44, 1, p. 23 - 31 9 p.

The interaction of lipophilic drugs with intestinal fatty acid-binding protein
Velkov, T., Chuang, S., Wielens, J., Sakellaris, H. H., Charman, W. N., Porter, C. J. & Scanlon, M., 2005, In: Journal of Biological Chemistry. 280, 18, p. 17769 - 17776 8 p.

Mapping and molecular modeling of S-adenosyl-L-methionine binding site in N-methyltransferase domains of the multifunctional polypeptide cyclosporin synthetase
Velkov, T. & Lawen, A., 2003, In: Journal of Biological Chemistry. 278, 2, p. 1137 - 1148 12 p.

Non-ribosomal peptide synthetases as technological platforms for the synthesis of highly modified peptide bioeffectors - cyclosporin synthetase as a complex example
Velkov, T. & Lawen, A., 2003, In: Biotechnology Annual Review. 9, p. 151 - 197 47 p.

Photoaffinity labeling of the N-methyltransferase domains of cyclosporin synthetase
Velkov, T. & Lawen, A., 2003, In: Photochemistry and Photobiology. 77, 2, p. 129 - 137 9 p.

Mapping and molecular modeling of S-adenosyl-L-methionine binding sites in N-methyltransferase domains of the multifunctional polypeptide cyclosporin synthetase
Velkov, T. & Lawen, A., 2002, In: Journal of Biological Chemistry. 278, 2, p. 1137 - 1148 12 p.

Prizes

APP2022050 Development Grant (McDevitt) 2023 to 2025 Breaking drug resistance in community acquired bacterial pneumonia (CABP)
Velkov, Tony (Recipient), 2023

ARC Mid-Career Industry Fellowship 2024 to 2027 Novel mass-scale biosynthesis: tailoring chemical logic and biosynthesis
Velkov, Tony (Recipient), 2023

Australian National Health and Medical Research Council Peter Doherty Training Fellow
Velkov, Tony (Recipient), 2006

CARB-X (the Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator) AU$2.68 million
Velkov, Tony (Recipient), 2023

Deans List status in the Faculty of Science for excellent achievement
Velkov, Tony (Recipient), 1996

Faculty of Pharmacy and Pharmaceutical Sciences Award for Research Impact (Economic and Social)
Velkov, Tony (Recipient), 2016

Member of the American Association for the Advancement of Science
Velkov, Tony (Recipient), 2004

Member of the American Protein Society
Velkov, Tony (Recipient), 2007

Member of the Anti-infective Pharmacology Group of the International Society Antimicrobial Chemotherapy
Velkov, Tony (Recipient), 2020

Member of the Australian Lung Foundation
Velkov, Tony (Recipient), 2009

Member of the Australian Pharmaceutical Science Association
Velkov, Tony (Recipient), 2006

Member of the Australian Society for Biochemistry and Molecular Biology
Velkov, Tony (Recipient), 2000

Member of the Australian Thoracic Society
Velkov, Tony (Recipient), 2009

Member of the Global Initiative on Antimicrobial Computational Pharmacology
Velkov, Tony (Recipient), 2020

Member of the Golden Key Honours Society (Australian Chapter)
Velkov, Tony (Recipient), 1998

Monash Biomedicine Discovery Institute Award for Outstanding Achievement - Industry Engagement and Commercialisation Award
Velkov, Tony (Recipient), 2022

Monash Major Interdisciplinary Research (IDR) Award
Velkov, Tony (Recipient), 2014

Monash University Linbrook Biochemistry Medal
Velkov, Tony (Recipient), 1995

Monash University Research Fund Postdoctoral Fellowship
Velkov, Tony (Recipient), 2001

NHMRC Career Development Industry Fellow Level 1
Velkov, Tony (Recipient), 2011

NHMRC Career Development Industry Fellow Level 2
Velkov, Tony (Recipient), 2015

NHMRC Research Excellence Award
Velkov, Tony (Recipient), 2011

NHMRC Research Excellence Award
Velkov, Tony (Recipient), 2015

NHMRC Ten of the Best Project Grant Award
Velkov, Tony (Recipient), 2015

REDI Industry Fellowship San Diego: Novel lipopeptide antibiotics targeting extremely drug resistant 'superbugs'.
Velkov, Tony (Recipient), 2022

Team Award for Research Impact [Economic and Social] (Faculty of Pharmacy and Pharmaceutical Sciences, Monash University)
Nation, Roger (Recipient), Velkov, Tony (Recipient), Li, Jian (Recipient), Roberts, Kade (Recipient) & Thompson, Philip (Recipient), 2016

University of Melbourne MDHS Faculty Research Fellowship
Velkov, Tony (Recipient), 2018

Vice Chancellors Award for Research Excellence, Deakin University
Velkov, Tony (Recipient), 2010

Vice-Chancellor's Award for Excellence in Research Engagement and Impact
Velkov, Tony (Recipient), 2022

Vice-Chancellor's Award for Excellence in Research Engagement and Impact (Monash University)
Nation, Roger (Recipient), Li, Jian (Recipient), Roberts, Kade (Recipient), Velkov, Tony (Recipient) & Thompson, Philip (Recipient), 2022

Victorian College of Pharmacy Early Career Researcher Award
Velkov, Tony (Recipient), 2008

Victorian Immunity and Infection Network Young Investigator Symposium Organizing Committee
Velkov, Tony (Recipient), 2016

Press/Media

A NEW WEAPON IN THE WAR AGAINST SUPERBUGS
Tony Velkov
15/10/21
1 Media contribution

ABC Radio
Tony Velkov
3/05/22
1 item of Media coverage

Antibiotic resistance is threatening our health. Will bacterial infection send us back to the medical dark age?
Tony Velkov
11/05/22
1 Media contribution

Antibiotic resistance: an arms race going on millions of years
Tony Velkov
2/06/22
1 item of Media coverage

From concept to clinic: How Monash researchers developed a novel antibiotic candidate to tackle deadly bacterial 'superbugs'
Tony Velkov
2/04/22
1 Media contribution

How to solve a problem like antibiotic resistance
Tony Velkov
3/03/17
1 Media contribution

Into the wild to fight antibiotic resistance
Tony Velkov
9/05/22
1 Media contribution

Melbourne scientist discovers how a natural antibiotic can 'deceive' superbugs
Tony Velkov
13/10/22
1 Media contribution

Natural antibiotic 'outsmarts' superbugs
Tony Velkov
3/06/20

1 Media contribution

New antibiotic to combat deadly bacterial ‘superbugs’ enters clinical trials
Tony Velkov
18/06/21
1 Media contribution

Projects

Advancing innovative therapies against pandrug-resistant Gram-negative superbugs
Li, J., Zhou, Q., Rao, G., Kaye, K. S. & Velkov, T.
NIH - National Institutes of Health (United States of America)
1/07/19 → 30/06/25

An examination of the role of sterol carrier protein and ileal bile acid binding protein in drug absorption: ID 384300
Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/06 → 31/12/09

Antibacterial Material Design via Mechanism-Based Mathematical Modelling
Whittaker, M., Landersdorfer, C. & Velkov, T.
31/01/20 → 31/12/23

Binocular Stereo Microscope
Scanlon, M. & Velkov, T.
Collier Charitable Fund
1/01/07 → 31/12/07

Combating Deadly Gram-negative Lung Infections: An Inhalation and Systems Approach
Li, J. & Velkov, T.
NIH - National Institutes of Health (United States of America)
1/08/17 → 31/07/22

Combating bacterial 'superbugs' by innovative dosing strategies that combine available antibiotics to prevent resistance
Landersdorfer, C., Boyce, J., Bulitta, J. B. B., Kirkpatrick, C., Nation, R., Oliver, A. & Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/13 → 31/12/16

Controlling a novel catalytic center within an innate immune system protein to dampen or heighten the immune response.
Irving, H., Velkov, T. & Manallack, D.
8/06/17 → 30/04/19

Deciphering the mechanisms of antibacterial activity and resistance of polymyxins in Gram-negative bacteria
Han, M. & Velkov, T.
1/07/16 → 30/06/17

Integrative systems pharmacology, neutron reflectometry and molecular dynamics approaches to unravelling the interaction between polymyxins and bacterial membranes
Li, J., Shen, H., Velkov, T., Song, J. & Schreiber, F.
1/01/18 → 31/12/23

NHMRC Career Development Award - Level 1 - Industry
Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/11 → 31/12/14

New tricks for 'old' drugs:PK/PD of polymyxin nonantibiotic combinations
Li, J., Song, J., Forrest, A., Creek, D., Velkov, T., Purcell, A. & Hertzog, P.
NIH - National Institutes of Health (United States of America)
1/04/14 → 31/03/19

Novel octapeptin antibiotics targeting extremely drug resistant 'superbugs'
Velkov, T., Li, J. & Thompson, P.
1/01/17 → 31/10/17

Optimising inhaled polymyxins as a vital therapy for pulmonary infections: A novel biochemical, molecular imaging and systems pharmacology approach
Li, J., Chan, H., Velkov, T., Zhou, Q. & Zhou, F.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/16 → 31/12/18

Pharmacology of intrathecal/intraventricular polymyxins: A systems-based approach
Rao, G., Velkov, T., Kaye, K. S. & Li, J.
1/07/20 → 30/06/24

Polymyxin-like lipopeptide antibiotics of the future
Velkov, T., Li, J. & Thompson, P.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/14 → 31/12/16

Rescuing the last-line therapy colistin against Gram-negative 'superbugs': increasing the therapeutic index by attenuation of nephrotoxicity
Li, J., Hill, P. A., Nation, R. & Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/12 → 31/12/14

Small molecule inhibitors of apical bile acid transporter in the ileum as therapeutic agents for hypercholesterolemia
Velkov, T.
Trustee for Helen Macpherson Smith Trust
17/03/11 → 31/12/12

Structural biology of mesothelin in the metastasis of asbestos-induced malignant pleural mesothelioma
Velkov, T.
Lung Foundation Australia
1/03/10 → 1/03/11

Targeting Superbugs: discovery and development of new broad-spectrum lipopeptide
Li, J., Dudley, M. N., Griffith, D., Hecker, S., Lomovskaya, O., Nation, R., Roberts, K., Thompson, P. & Velkov, T.
NIH - National Institutes of Health (United States of America)
1/06/12 → 31/05/17

Targeting polymyxin-resistant Gram-negative 'superbugs': development of novel antimicrobial peptides
Li, J., Nation, R., Thompson, P. & Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/10 → 31/12/12

Targeting the Achilles' heel of polymyxins: eliminating the nephrotoxicity
Li, J., Nation, R., Thompson, P. & Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/15 → 31/12/17

Targeting the Urgent Need for New Antibiotics against Gram-negative 'Superbugs'
Li, J., Velkov, T., Roberts, K., Thompson, P. & Nation, R.
1/08/17 → 31/07/23

The Hunt for New-generation Lipopeptide Antibiotics Targeting Gram-negative 'Superbugs'
Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/01/15 → 31/10/17

The structure and receptor binding properties of the 2009 swine influenza pandemic Hemagglutinin
El-Kabbani, O. & Velkov, T.
National Health and Medical Research Council (NHMRC) (Australia)
1/07/09 → 30/06/10

UV-visible spectrophotometer and software
El-Kabbani, O., Capuano, B., Chung, R. & Velkov, T.
Collier Charitable Fund
1/01/09 → 30/09/09