# University of Birmingham

# Dr Francesco Michelangeli

Senior Lecturer

**School of Biosciences (/schools/biosciences/index.aspx)**

## Contact details

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## About

I am the current head of Biochemistry degree programmes.

I am in the molecular and cellular biology research theme.

My research field is in calcium signalling.

## Qualifications

B.Sc (Hons) Biochemistry University of Lancaster

Ph.D Biochemistry University of Southampton

Fellow of the Society of Biology (FSB)

## Teaching

I am the current head of biochemistry undergraduate programmes.
I teach many aspects of biochemistry / biomedical sciences to undergraduates studying for degrees in Biochemistry, Biological Sciences, Medicine, and Biomedical / Biomaterial sciences. I also teach on the M.Sc. programme in Toxicology. My lecture topics cover a variety of subjects including metabolism, metabolic control, regulation of enzymes, signal transduction, membranes and transport, pharmacology, immunology and the molecular basis of disease.

I have also devised and supervise numerous undergraduate practical classes in enzymology, lipid analysis, immunology and hormone regulation. I teach membrane transport and calcium homeostasis on the to final year undergraduates.

## Postgraduate supervision

For a list of possible PhD projects offered by Dr Michelangeli:

**www.findaphd.com/search/customlink.asp?inst=birm-Biol&supersurname=Michelangeli (http://www.findaphd.com/search/customlink.asp?inst=birm-Biol&supersurname=Michelangeli)**

## Research

Research Theme: Molecular and Cell Biology

Full research description:

Biochemical characterisation of ER Ca2+ Channels & Pumps

Currently, my work has been focusing on links between aberrations in Ca2+ signalling pathways (caused by diseases or toxic insults) and induction of cell death. This work has used a variety of cells derived from neuronal, cardiovascular and testicular sources. My more recent work has involved investigating the molecular basis of toxicity of environmental pollutants and how they can affect male fertility and neuronal function. As an extension to this work, in collaboration with others I am also investigating the role of Ca2+ transporters in sperm viability and motility. Another current area of research is an investigation of the Golgi-specific Ca2+ pump (SPCA) and its modulation by novel regulatory proteins.

Other areas of interest include:

- Kinetics, pharmacology and regulation of intracellular Ca2+ channels such as the InsP3 receptor and Ryanodine receptor.
- Kinetics, pharmacology and regulation of Ca2+ ATPases.
- Drug-membrane interactions.

Development of fluorescence-based assays.

## Other activities

I regularly referee grant applications in the area of calcium homeostasis for possible funding by the research councils and medical charities.

I have served as an editorial advisor for the Biochemical Journal (1992-1995) and as an editorial board member from 1995-2002. I am currently on the editorial boards of Bioscience Reports, Biochemical Society Transactions and The Open Journal of Enzyme Inhibition.

I was on the executive committee and council of the Biochemical Society and its Honorary Membership Secretary until end 2013.

I am a Pharmacology adviser / expert to the Pakistan High Commission for Education, were I have assessed promotions to chairs in several universities in Pakistan.

## Publications

A Plethora of interacting organellar Ca2+ stores.
F. Michelangeli, O.A. Ogunbayo & L.L. Wootton (2005)
Current Opinions in Cell Biology 17, 135-140

Complex [Ca2+]i signals in human spermatozoa depend upon a Ca2+ store regulated by secretory pathway Ca2+-ATPase (SPCA1) Ca2+ pumps
C. Harper, L. Wootton, F. Michelangeli, L. Lefievre, C. Barratt, S. Publicover (2005)
J. Cell Science 118, 1673-1685

Calcium signalling in human spermatozoa: a specialized 'toolkit' of channels, transporters and stores.
C. Jimenez-Gonzalez, F. Michelangeli, C.V. Harper, C.L.R. Barratt & S.J. Publicover (2006)
Human Reproduction Update 12; 253-267

The effects of the phenylalanine 256 to valine mutation on the sensitivity of SERCA Ca2+ pump isoforms: 1, 2 & 3 to thapsigargin and other inhibitors
L.L. Wootton & F. Michelangeli (2006)
Biol. Chem. 281; 6970-6976

Understanding the physiology of pre-fertilization events in the human spermatozoa- a necessary prerequisite to developing rational therapy
S.J. Conner, L. Lefievre, J. Kirkman-Brown, F. Michelangeli, C. Jimenez-Gonzalez, G.S.M. Macchado-Oliveirea, K.L. Pixton, I.A. Brewis, C.L.R. Barrat & S.J. Publicover (2007)
Soc. Reprod. Fertil. Suppl. 63; 237-255

The interactions of the brominated flame retardant: Tetrabromobisphenol A with phospholipid membranes
O.A. Ogunbayo, K.T. Jensen, F. Michelangeli (2007)
Biochimica et Biophysica Acta 1768; 1559-1566

The brominated flame retardant, tetrabromobisphenol A, inhibits SERCA Ca2+ pumps and sensitizes the Ryanodine receptor
O.A. Ogunbayo, H. Ho Tin Wu, F. Michelangeli (2007)
Proceedings Physiol. Soc. Life Sciences; PC 270

The effects of tetrabromobisphenol-A, a brominated flame retardant, on Ca2+ signalling and cell viability in Sertoli cells
P.F. Lai, O.A. Ogunbayo, T.J. Connolly, F. Michelangeli (2007)
Proceedings Physiol. Soc. Life sciences; PC271

The widely utilized brominated flame retardant, tetrabromobisphenol A (TBBPA) is a potent inhibitor of the SERCA Ca2+ pump.
O.A. Ogunbayo & F. Michelangeli (2007).
Biochemical Journal. 408; 407- 415

The brominated flame retardant, Tetrabromobisphenol-A (TBBPA), induces cell death in cultured Testicular TM4 Sertoli cells via a mechanism involving Ca2+ mobilization: TBBPA can affect both SERCA Ca2+ pumps and Ryanodine receptor Ca2+ channels.
O.A. Ogunbayo, P.F. Lai, T.J. Connolly & F. Michelangeli (2008)
Toxicology In-Vitro 22; 943-952

Endocrine disrupting alkylphenols: Structural requirements for their adverse effects on Ca2+ pumps, Ca2+ homeostasis & Sertoli TM4 cell viability.
F. Michelangeli, O.A. Ogunbayo, L.L. Wootton, P.F. Lai, F. Al-Mousa, R.M. Harris, R.H. Waring & C.J. Kirk. (2008)
Chemico-Biological Interactions 176; 220-226

Inhibition of the sarcoplasmic / endoplasmic reticulum Ca2+-ATPase (SERCA) by flavonoids: A quantitative structure-activity relationship study.
O.A. Ogunbayo, R.N. Harris, R.H. Waring, C.J. Kirk & F. Michelangeli (2008)
IUBMB-Life 60; 853-858

The commonly used Ryanodine receptor activator, 4-chloro-m-cresol (4CmC), is also an inhibitor of SERCA Ca2+ pumps.
F. Al-Mousa and **F. Michelangeli** (2009)
Pharmacological Reports 61; 838-842

Dual mechanism of sHA 14-1 in inducing cell death through endoplasmic reticulum and mitochondria.
D. Hermanson, S,N. Addo, A.A. Bajer, J.S. Marchant, S. Goutam, K. Das, B. Srinivasan, F. Al-Mousa, **F. Michelangeli**, D.D. Thomas, T.W. LeBien, C. Xing (2009)
Molecular Pharmacology 76; 667-678

Changes in expression and activity of the secretory pathway Ca2+ ATPase 1 (SPCA1) in A7r5 vascular smooth muscle cells, cultured at different glucose concentrations.
P. Lai and **F. Michelangeli** (2009)
Bioscience Reports 29; 397-404

Ca2+-stores in sperm: their identities and functions.
S. Costello, **F. Michelangeli** , K. Nash, L. Lefievre, C. Ford, J. Morris, G. Machado-Oliveira, J. Kirkman-Brown, S. Publicover. (2009)
Reproduction 138; 425-437

Alisol B is a novel inhibitor of the SERCA pump that induces autophagy, ER-stress and apoptosis
B.Y.K. Law, M. Wang, E. Ma, F. Al-Mousa, **F. Michelangeli**, A. Wong, M. Ng, K. To, A.Y.F. Mok, S.K. Lam, F. Chen, C. Che, P. Chiu, B.C.B. Ko. (2010)
Mol Cancer Therapeutics 9; 718-730

A Diversity of SERCA Ca2+ pump Inhibitors
**F. Michelangeli** & J.M. East (2011)
Biochemical Society Transactions 39; 789-797

Recent advances in membrane biochemistry
J.M. East & **F. Michelangeli** (2011)
Biochemical Society Transactions 39; 703-709

Regucalcin (RGN/SMP30) alters agonist- and thapsigargin-induced cytosolic [Ca2+] transients in cells by increasing SERCA Ca2+ATPase levels
P. Lai & **F. Michelangeli** (2011)
FEBS Letts 585, 2291-2294

Some commonly used brominated flame retardants cause Ca2+-ATPase inhibition, , beta-amyloid peptide release and apoptosis in SH-SY5Y neuronal cells
F. Al-Mousa & **F. Michelangeli** (2012)
PLOS *One* 7; e33059, 1-8

Bis(2-hydroxy-3-tert-butyl-5-methyl-phenyl)-methane (bis-phenol) is a potent and selective inhibitor of the secretory pathway Ca2+ ATPase (SPCA1)
P. Lai & **F. Michelangeli** (2012)
Biochem. Biophys. Res. Comm. 424; 616-619

Ca2+ signalling through CatSper and Ca2+ stores generates functional diversity in human sperm behavior.
S. Costello, W. Alasari, J. Correia, S.K. Oxenham, L. Fernandes, J. Kirkman-Brown,
**F. Michelangeli**, C. Barratt & S. Publicover
J. Biol Chem. (2013) 288; 6248-6258

Saikosaponin-d, a novel SERCA inhibitor induces autophagic cell death in apoptosis-defective cells.
VKW Wong, T Li, BYK Law, EDL Ma, NC Yip, **F Michelangeli**, CKM Law, MM Zhang,
KYC Lam, PL Chan, & L Liu
Cell Death & Disease (2013) 4; e720 doi 10.1038/cddis.2013.217

The sarcoplamsic-endoplasmic reticulum Ca2+-ATPase (SERCA) is the likely molecular target for the acute toxicity of the brominated flame retardant, hexabromocyclododecane (HBCD)
F. Al-Mousa & **F. Michelangeli**
Chemico-Biological Interactions (2014) 207; 1-6

Related flavonoids cause Cooperative inhibition of the the sarcoplasmic reticulum Ca2+ATPase by multimode mechanisms
O.A. Ogunbayo & **F. Michelangeli**
FEBS Journal (2014) (in press)