

sessions

4th IUBMB Conference

session: Signal Termination and Compartmentalization

G-protein-coupled receptor kinases and arrestins: regulators of G-protein-coupled receptor sequestration	S. S. G. FERGUSON, J. ZHANG, L. S. BARAK AND M. G. CARON	953
Molecular mechanisms underlying the activation and regulation of the α_{1B}-adrenergic receptor	S. COTECCHIA, A. SCHEER, F. FANELLI AND T. COSTA	959
Plant K⁺ channels: structure, activity and function	I. CHÉREL, P. DARAM, F. GAYMARD, C. HOREAU, J.-B. THIBAUD AND H. SENTENAC	964
Transduction of Ca²⁺ signals in plant cells and compartmentalization of the Ca²⁺ signal	A. TREWAVAS, N. READ, A. K. CAMPBELL AND M. KNIGHT	971
Regulators of G-protein-mediated signalling	M. J. LOHSE, K. BLÜML, S. DANNER AND C. KRASEL	975
The N-terminal alternately spliced regions of PDE4A cAMP-specific phosphodiesterases determine intracellular targeting and regulation of catalytic activity	M. D. HOUSLAY	980
Properties of A-kinase anchoring proteins	Z. E. HAUSKEN AND J. D. SCOTT	986
Regulation of 'signalling diacylglycerol' in cells: the importance of diacylglycerol kinase	M. N. HODGKIN, T. R. PETTITT, A. MARTIN AND M. J. O. WAKELAM	991
Regulation of second messengers by the inositol polyphosphate 5-phosphatases	C. A. MITCHELL, S. BROWN, J. K. CAMPBELL, A. D. MUNDAY AND C. J. SPEED	994
The family of inositol and phosphatidylinositol polyphosphate 5-phosphatases	A. L. DRAYER, X. PESASSE, F. DE SMEDT, D. COMMUNI, C. MOREAU AND C. ERNEUX	1001
Multiplicity within cyclic nucleotide phosphodiesterases	S. D. RYBALKIN AND J. A. BEAVO	1005
cGMP-inhibited phosphodiesterases (PDE3 gene family)	E. DEGERMAN, P. BELFRAGE AND V. C. MANGANIELLO	1010
Role of multiple cAMP-specific phosphodiesterase variants	T. BUSHNIK AND M. CONTI	1014
cGMP signal termination	N. J. PYNE, V. ARSHAVSKY AND A. LOCHHEAD	1019

session: Cellular Stress and Protein Mechanisms

Free radicals, proteins and DNA: oxidative damage versus redox regulation	B. HALLIWELL	1023
--	--------------	-------------

Control of cell proliferation by reactive oxygen species R. H. BURDON **1028**

Dithiocarbamates and the redox regulation of cell death S. ORRENIUS, C. S. I. NOBEL, D. J. VAN DEN DOBBELSTEEN, M. J. BURKITT AND A. F. G. SLATER **1032**

session: Cellular Fates of Proteins

How cells instruct the immune system to carry out their elimination M. FERNANDEZ-BORJA AND J. J. NEEFJES **1039**

Intracellular protein synthesis, modifications and aging S. I. S. RATTAN AND B. F. C. CLARK **1043**

session: Cell Death Mechanisms

Apoptosis as a trigger of inflammation in *Shigella*-induced cell death A. GUICHON AND A. ZYCHLINSKY **1051**

Apoptosis in AIDS. Genetic control and relevance for AIDS pathogenesis M.-L. GOUGEON **1055**

Cell death signal transduction and Bcl-2 function J. L. HERRMANN, E. BRUCKHEIMER AND T. J. McDONNELL **1059**

Phagocyte recognition of apoptotic cells J. SAVILL **1065**

Cumulative indices:

Author index **1071**
 Keyword index **1107**

Corrections: **1131**

Cell growth, control and development

Speaker abstracts

Elements of the cell cycle	H. NISHITANI, B. GRALLERT, J. HAYLES, D. FISHER AND P. NURSE	507S
Asymmetric accumulation of Ash1 in post-anaphase nuclei depends on a myosin and restricts yeast mating type switching to mother cells	K. NASMYTH, N. BOBOLA, R.-P. JANSEN AND T.-H. SHIN	507S
Coupling DNA replication to the cell cycle	R. A. LASKEY, T. KRUDE, M. MADINE, D. COVERLEY, P. ROMANOWSKI AND A. D. MILLS	507S
The centrosome cycle	D. M. GLOVER	507S
The interface between DNA damage repair and transcription	J. H. J. HOEIJMAKERS	508S

Poster abstracts

Substance P acts as a cell-cycle-dependent modulator of human skin fibroblast proliferation <i>in vitro</i> – influence of the arachidonic acid cascade	C. M. KÄHLER, M. HEROLD, N. REINISCH AND C. J. WIEDERMANN	509S
Induction of the proto-oncogene <i>c-fos</i> in PC12 cells by cadmium	S. HECHTENBERG, T. SCHÄFER, J. BENTERS AND D. BEYERSMANN	509S
Cloning and characterization of a <i>P. falciparum</i> transcriptional factor related to the SNF2 global transcriptional activator family	D.-D. JI AND D. ARNOT	509S
The role of potassium channels in T-lymphocytes	S. BADLEY, C. DART, E. CONLEY AND W. BRAMMAR	509S
Transformation-defective E1A products of the Ad12-non-oncogenic host-range mutant CS-1 are able to disrupt E2F-containing complexes and to transactivate E2F-motif-containing promoters	H. M. RUMPF, J. GNAUCK, H.-C. KIRCH, H. ESCHE AND B. M. PÜTZER	510S
Coupling efficiency of DNA penetration through the yeast <i>Saccharomyces cerevisiae</i> cytoplasmic membrane to the cell cycle	L. CHAUSTOVA AND A. JASAITIS	510S
Studies on the role of tissue transglutaminase in human melanoma cell lines	C. I. SCHOLFIELD, P. A. SMETHURST, B. L. NICHOLAS, R. C. REES AND M. GRIFFIN	510S
Adenosine regulates DNA synthesis induced by TSH, insulin and PMA in thyroid FRTL-5 cells	M. VAINIO, P. SAARINEN, L. ANDERSSON AND K. TÖRNQUIST	510S
Detection and characterization of a CDK2 variant in rodents and C3H10T1/2 mouse cells	C. ELLENRIEDER AND R. JAUSI	511S
Cytoplasmic accumulation of <i>cdc25B</i> phosphatase in mitosis triggers centrosomal microtubule nucleation in HeLa cells	C. P. C. DE SOUZA	511S
The influence of zinc on the fate of cells	J. K. CHESTERS, L. PETRIE AND R. BOYNE	511S
Human pancreatic B-cell proliferation <i>in vitro</i> and <i>in vivo</i>	B. TYRBERG, D. L. EIZIRIK, C. HELLERSTRÖM, D. G. PIPELEERS AND A. ANDERSSON	511S
Site-specific interaction of protein S1 with RNAs from RNA bacteriophages	D. M. Isaeva	512S

Differential cell-cycle arrest and apoptosis following inducible expression of the cyclin-dependent kinase inhibitor p21 Cip1 in human cells	A. B. NICULESCU III, L. HENGST, M. SMEETS AND S. I. REED	512S
Stathmin expression is associated with the ability of cells to progress through the cell cycle	W. E. B. JOHNSON, S. S. GUEST, D. C. ROWLANDS, K.-M. TOELLNER, N. A. JONES, I. C. M. MACLENNAN AND G. BROWN	512S
Cloning and partial characterization of a novel <i>Xenopus</i> B-type cyclin	J. A. KIRK AND T. HUNT	512S
Characterization of cdc2-related kinases from <i>Leishmania mexicana</i>	K. M. GRANT AND J. C. MOTTRAM	513S
Proliferation-dependent changes in binding and activity of type I phospholipase A2 in uterine stromal cells	C. LAUGIER, C. TESSIER, G.-P. ROSSINI, M. LAGARDE AND J.-M. FAYARD	513S
Formation of DHA-rich bis(monoacylglycerol) phosphate in uterine stromal cells	J. F. PAGEAUX, M. LAGARDE AND C. LAUGIER	513S
Ribonucleotide reductase gene expression in mouse brown adipose tissue	M. FREDRIKSSON AND J. NEDERGAARD	513S
Concanavalin A as a probe for the epidermis-specific secretion of glycoproteins during IAA-induced growth in rye coleoptiles	H. G. EDELMANN	514S
Respiration and structural lipids of callus cells in growth process	A. LYGIN, A. IVANOVA AND L. GORDON	514S
Enhanced phosphorylation of pRB, depressed expression of c-myc and apoptosis of HPV-transformed human keratinocyte by trichotumoricin, a novel tumoricidal protein	M. MANABE, K. KITTA AND Y. KAWAMURA	514S
Effect of <i>WHI2</i> expression on lifespan in <i>Saccharomyces cerevisiae</i>	M. G. BARKER, P. E. SUIDBERY AND K. A. SMART	514S
The G1 arrest caused by nitrogen starvation in yeast is mediated by Cln cyclin degradation	C. GALLEGO, N. COLOMINA, E. GARÍ, E. HERRERO AND M. ALDEA	515S
Extracellular ATP stimulates the expression of early genes: roles of calcium, protein kinase C and MAP kinase	E. EKOKOSKI AND K. TÖRNQUIST	515S
Lycopene, the major tomato carotenoid, delays cell-cycle progression in cancer cells	M. KARAS, H. AMIR, J. GIAT, M. DANILENKO, J. LEVY AND Y. SHARONI	515S
Cell cycle and PKC isoenzyme activation in promyeloid U937 cells	E. M. DEACON, J. PONGRACZ, H. CHAHAL, T. PETTIT, M. J. O. WAKELAM AND J. M. LORD	515S
Regulation of prothymosin α during the cell cycle. Evidence for E2F involvement	K. VARELI, O. TSOLAS AND M. FRANGOU-LAZARIDIS	516S
Characterization of the translationally regulated, microtubule-binding protein P23	Y. GACHET, M. LEE, B. SAWITZKI, T. POULTON AND U.-A. BOMMER	516S
Yeast genes involved in both cell-cycle regulation at checkpoints and maintenance of various genetic structures	N. A. KOLTOVAYA AND A. B. DEVIN	516S
Involvement of DP-I protein in E2F-induced cell death	A. FANIDI, E. VERMAAS AND A. R. FATTAEY	516S

Signal termination and compartmentalization – desensitization in plant and animal cells

Speaker abstracts

Molecular mechanisms underlying the activation and regulation of the $\alpha 1$ adrenergic receptor	S. COTECCHIA, A. SCHEER AND F. FANELLI	517S
Regulatory mechanisms underlying phosphoinositide signalling	S. R. NAHORSKI, G. B. WILLARS, M. WAUGH AND A. B. TOBIN	517S
Signal processing through the ethylene receptor ETR1 from <i>Arabidopsis thaliana</i>	A. B. BLEECKER, G. E. SCHALLER, J. SPANBAUER, F. RODRIGUEZ, A. HALL AND B. M. BINDER	517S
Phytochromes: photosensory perception and signal transduction	P. H. QUAIL	517S
Potassium-channel activity and function in plant cells	H. SENTENAC	518S

Poster abstracts

A hierarchy of ATP-consuming processes	F. BUTTGEREIT AND M. D. BRAND	519S
A spontaneous increase of cyclic AMP levels in <i>Aspergillus niger</i>	M. GRADIŠNIK-GRAPULIN AND M. LEGISA	519S
How do plants resist microbial infection?	K. HAMMOND-KOSACK, P. BRADING, K. HARRISON, D. A. JONES, P. PIEDRAS, M. A. TORRES AND J. D. G. JONES	519S
Rapid activation of cAMP-phosphodiesterase by parathyroid hormone in UMR-106 osteoblast-like cells	M. AHLSTRÖM AND C. LAMBERG-ALLARDT	519S
Inositol 2,4,5-trisphosphate is a partial agonist of hepatic inositol trisphosphate receptors	J. S. MARCHANT AND C. W. TAYLOR	520S
The difference of phytochrome action on PDE activity in etio and green maize seedlings	K. G. GASUMOV	520S

Cellular stress and protection mechanisms – response to stress by oxidants: genetic effects; control of cell death by oxidants

Speaker abstracts

Free radicals, proteins and DNA. Oxidative damage versus redox regulation	B. HALLIWELL	521S
The bacterial response to oxidative stress: regulation by a redox-sensitive transcription factor and a regulatory RNA	G. STORZ, M. ZHENG, A. ZHANG, I. KULLIK, M. TOLEDANO AND S. ALTUVIA	521S
Mechanisms of programmed cell death: free radicals, proteases and other stories	M. D. JACOBSON	521S
Control of cell proliferation by oxidants	R. H. BURDON	521S
Redox modulation of apoptotic cell death	S. ORRENIUS, S. NOBEL, D. J. VAN DEN DOBBELSTEEN AND A. F. G. SLATER	522S
The paradox of reactive oxygen species, apoptosis and Bcl-2	D. E. BREDESEN	522S
Oxidants and multiple mutations in cancer	L. A. LOEB, T. NEWCOMB, A. JACKSON AND S. RINK	522S

Poster abstracts

Phospholipids are possible regulators of lipoxygenase reaction on membrane level	V. BABENKO, I. BUTOVICH, M. KAZACHKOV, A. KULINICHENKO AND T. PALIY	523S
--	---	------

Changes in the cell structure and metabolism of seeds <i>Acer tataricum</i> L. during jasmonic acid treatment	L. BABENKO, G. MARTYN, L. MUSANTENKO AND K. SYTNIK	523S
Single micro-injection of L-glutamate induces oxidative stress in the cerebral cortex of rat	G. N. BABU AND M. BAWARI	523S
Free radical lipid peroxidation products in plasma of hypersensitive patients	S. A. SAEED, B. H. SHAH AND A. H. GILANI	523S
Studies on the hepatoprotective effects of rutin on acetaminophen and CCL ₄ -induced hepatotoxicity	A. H. GILANI AND K. H. JANBAZ	524S
Regulation of ascorbate synthesis in murine liver	G. BÁNHEGYI, L. BRAUN, M. CSALA, T. GARZÓ AND J. MANDL	524S
Survival after ionizing irradiation of human melanocyte and melanoma cells	C. P. THOMAS AND A. BURONFOSSE	524S
Enzymes of CO ₂ photosynthetic metabolism in ontogenesis of wheat under conditions of normal water supply and those of shortage of water	J. A. ALIEV, N. M. GULIEV, T. G. MAMEDOV, E. B. ABDULLAEVA AND R. B. HIDAYATOV	524S
Induction of inducible NO synthase is an essential part of TNF α -induced apoptosis in MCF-7 cells	C. BINDER, M. SCHULZ, B. FUSS, W. HIDDEMANN AND M. OELLERICH	525S
Protein binding – a prerequisite for the antioxidation effect of α -tocopherol (vitamin E) in cellular membranes	C. K. PUSHPENDRAN	525S
Antioxidant enzyme status of soleus and EDL muscles in MyoD-deficient mice	P. M. TIIDUS, E. BOMBARDIER, J. XENI, N. BESTIC, R. VANDENBOOM, M. RUDNICKI AND M. E. HOUSTON	525S
The use of mild salt stress and niacinamide to measure the fitness of plant populations and tissue culture	M. DE BLOCK	525S
Nitric oxide production from γ -irradiated resident peritoneal macrophage and its relation with reactive oxygen intermediates	R. GOTO AND Y. IBUKI	526S
Effect of β -carotene supplementation on DNA damage in human peripheral blood lymphocytes	S. B. ASTLEY, D. A. HUGHES, A. J. A. WRIGHT, A. C. J. PEERLESS AND S. SOUTHON	526S
Response of cells to stress by environmental and chemical factors	H. M. YOUNIS	526S
Modulating action of irradiation on kinetics and expression of apoptosis induced by heat shock in human lymphocytes	S. V. SHELEG, A. I. SVIRNOVSKI AND S. I. KRIVENKO	526S
Induction of NO synthase activity and cytokine production in macrophages by a carrier-associated muramyl peptide	G. BARRATT, I. SEYLER, M. APPEL, P. LEGRAND, F. PUISIEUX AND J. P. DEVISSAGUET	527S
Calcium accumulation in the rat brain and ultrastructure of the hippocampal CA1 region following carbon monoxide inhalation	S. E. DYSON AND B. J. HUNT	527S
Hyperoxia induces differentiation of neuronal cells by producing reactive oxygen species	S. KATOH, T. SUZUKI, K. KITANI AND Y. MITSUI	527S
Mitochondria are the functional intracellular target of a boronated porphyrin photosensitizer	P. NAGLEY, A. SRIRATANA, A. D. MUNDAY, R. GURUNG, M. BILLS, C. ZHANG, J. S. HILL AND S. B. KAHL	527S
Comparison of the effects of ischaemia/reperfusion on the mitochondrial respiratory chain in nerve terminals from adult or neonatal rats	T. E. BATES, J. KEELAN, S. E. WRYTER AND J. B. CLARK	528S

Chemiluminescence of bone marrow cells in mice of various strains	A. D. DURNEV, N. V. GUSEVA AND S. B. SEREDENIN	528S
Ferrous iron dopamine-induced lipid peroxidation and apoptosis in PC12 cell line	C. VELEZ-PARDO, M. JIMENEZ DEL RIO, H. VERSCHUEREN, G. EBINGER AND G. VAUQUELIN	528S
Inhibition of the growth of human malaria parasite <i>P. falciparum</i> by antisense oligodeoxynucleoside phosphorothioates	R. KANAGARATNAM, M. MISIURA, G. REBOWSKI, R. AMERAKOON, W. J. STEC AND R. RAMASAMY	528S
Role of mitochondria dysfunction in the development of inherited predisposition to the diseases involving enhanced oxygen radical formation in the rats Wistar/S	A. DIKALOVA, S. DIKALOV, N. KOLOSOVA, I. SHABALINA AND R. SALGANIK	529S
Role of iron in survival of embryonic stem cells	S. CASTRO-OBREGÓN AND L. COVARRUBIAS	529S
Oxidative stress and cell death during mouse development	L. COVARRUBIAS, E. SALAS-VIDAL, H. LOMELÍ, S. CASTRO-OBREGÓN AND R. CUERVO	529S
Glutamate causes energetic metabolism alterations and free-radical formation in rat cerebellar granule cells	A. ATLANTE, S. GAGLIARDI, G. M. MINERVINI, E. MARRA, S. PASSARELLA AND P. CALISSANO	529S
Sensitivity of human and rat pancreatic islets to peroxynitrite-mediated cell dysfunction and death	C. A. DELANEY, B. TYRBERG AND D. L. EIZIRIK	530S
Hydrogen peroxide induces apoptosis in human renal tubular epithelial cells isolated from normal and polycystic kidneys	A. REITH AND S. FLEMING	530S
Glyoxalases and apoptosis in human melanoma cells	F. AMICARELLI, A. BONFIGLI, A. POMA, C. DI ILIO AND M. MIRANDA	530S
Development of pathology in plant cells in relation to the level of plasmalemma permeability for ions	F. MINIBAYEVA AND L. GORDON	530S
Apoptosis does not alter metabolism or biochemistry; involvement of the cytoskeleton in apoptotic cell restructuring	J. M. GARLAND AND A. HALESTRAP	531S
Protection from apoptosis by antioxidants: the importance of cell adhesion	W. MALORNI, E. STRAFACE, R. RIVABENE, G. RAINALDI, A. M. GIAMMARIOLI AND P. MATARRESE	531S
Detoxifying enzymes and apoptosis in truffles	C. DI ILIO, F. AMICARELLI, A. POMA, O. ZARIVI, A. BONFIGLI, G. PACIONI AND M. MIRANDA	531S
Apoptosis induced by 9-, 10-OH stearic acids in human HT29 adenocarcinoma cells	N. GESMUNDO, E. CASALI, C. BOGA, G. FARRUGGIA, M. NOVELLO, S. ZANNA AND L. MASOTTI	531S
Possible antioxidant action of the Bcl-2 protein	K. MARSHALL, L. ELLERBY, H.-G. WANG, J. C. REED, D. E. BREDESEN, O. I. ARUOMA AND B. HALLIWELL	532S
Endogenous pro-oxidant status and H ₂ O ₂ -mediated impairment of cell mitochondrial functions, ATP content and proliferative capacity	M. COMELLI, F. DI PANCRAZIO AND I. MAVELLI	532S
Plasma levels of coenzyme Q and vitamin E as possible indexes of cell proliferation	P. L. DORDONI, S. LIPPA, L. COLACICCO, C. CALLÀ, C. ANASTASIO, R. PARRONI AND M. L. GOZZO	532S
Early cellular events leading to photodynamically induced cell death	D. J. BALL, S. R. WOOD, D. I. VERNON AND S. B. BROWN	532S
Rotenone-induced mitosis, endoreduplication and apoptosis are not mediated via mitochondrial respiratory chain inhibition	M. GU, A. H. V. SCHAPIRA AND J. M. COOPER	533S

Photosensitization induces apoptotic or necrotic-like cell death depending on intracellular photosensitizer (Photofrin®) distribution	M. DELLINGER	533S
Prevention of hydrogen peroxide- and cisplatin-induced apoptosis by catalase overexpression	H. B. ORAL, A. J. T. GEORGE AND D. O. HASKARD	533S
ADP-ribosylations in oxidative-stress-induced apoptosis	S. COPPOLA, C. COLUSSI, C. ALBERTINI, S. ROVIDATI, F. CANESTRARI AND L. GHIBELLI	533S
Peroxidative stress during rat splenocyte proliferation may result in damage to mitochondria	C. PIERI, M. MARRA, F. MORONI, F. MARCHESELLI, R. RECCHIONI AND C. BENATTI	534S
The scavenging capacity of serum influences haemoglobin glycosylation in NIDDM patients	R. TESTA, A. R. BONFIGLI, I. TESTA, S. MANFRINI, L. PIANTANELLI, M. MARRA AND C. PIERI	534S
Nitric oxide inhibits interferon- γ - and lipopolysaccharide-induced nitric oxide synthase expression in murine BNL CL.2 cells	S. G. PAIK, B.-S. LEE, Y. M. KIM AND I. CHOI	534S
The adaptation of <i>Dunaliella salina</i> cells to high salt concentration. Isolation of 63 and 28 kDa salt-induced polypeptides	V. A. AJALOV, T. V. SAVCHENKO AND J. A. ALIEV	534S
Endotoxaemia in transgenic mice with antioxidant enzymes	O. MIROCHNITCHENKO, U. PALNITKAR AND M. INOUE	535S
The effect of photodynamic therapy on the glutathione levels in macrophages	F. M. IVISON, D. I. VERNON AND S. B. BROWN	535S
Effect of successive incubations with TNF- α and IL-1 on the <i>in vitro</i> aging of WI-38 fibroblasts	O. TOUSSAINT, P. DUMONT AND J. REMACLE	535S
1,10-phenanthroline activates endogenous copper ions, resulting in radical-mediated internucleosomal DNA fragmentation	M. J. BURKITT, L. MILNE, P. NICOTERA AND S. ORRENIUS	535S
Formation of iron-nitrosyl complexes protects K/VP.5 cells against t-butylhydroperoxide-induced oxidative stress	N. V. GORBUNOV, J. C. YALOWICH, A. GADDAM, N. M. ELSAYED AND V. E. KAGAN	536S
Effect of the copper-1,10-phenanthroline complex on Hep-G2 cells	S. Y. TSANG, S. C. TAM, I. BREMNER, L. MILNE AND M. J. BURKITT	536S
A microculture tetrazolium assay which works exclusively via DT-diaphorase	C. J. GOODWIN, S. DOWNES, S. J. HOLT AND N. J. MARSHALL	536S
Reduction of coenzyme Q by DT-diaphorase in isolated hepatocytes: interactive roles in antioxidant cellular protection	M. CAVAZZONI, M. SETTI, G. LENAZ AND G. BEYER	536S
Further studies on IDDM serum-induced pancreatic β -cell death – evidence for a cytoprotective role for glutamine	E. M. CARAHER AND P. NEWSHOLME	537S
Oxidative stress may induce reduction of brain transmitter content in Pacific salmon	M. E. GÖTZ, A. DIRR, D. BLUM-DEGEN, R. BURGER, R. HARTH, P. RIEDERER AND D. L. MEYER	537S
Functional role of acute-phase proteins in cancer cells	S.-Y. LEE, J.-W. LIM AND J.-H. KANG	537S
<i>Uncaria tomentosa</i> extract influence on peroxynitrite formation and NADPH oxidase activity	E. A. OSTRACHOVICH, N. V. GETMANSKAYA, V. V. BORODULIN AND A. D. DURNEV	537S
Brain ischaemia and reperfusion: evaluation of the effect of pentoxifylline on rat model	G. KIRKALI, S. GEZER, H. RESMI AND A. GÜNER	538S

Yeast cell response to water stress: structural and functional changes and protective reactions	A. RAPOPORT, G. KHROUSTALYOVA, I. KRALLISH, E. VENTINA AND O. MUTER	538S
Red blood cells damage by oxygen free radicals generated during haemodialysis	K. GWOZDZINSKI AND M. JANICKA	538S
Direct, real-time measurement of free radical production by brain cells in culture	P. MANNING, C. J. MCNEIL, E. W. HILLHOUSE AND J. M. COOPER	538S
Enhanced oxidative stress and genomic instability in the progeny of irradiated haemopoietic stem cells	S. M. CLUTTON, K. M. S. TOWNSEND, J. D. ANSELL AND E. G. WRIGHT	539S
Effect of hyperthermia on expression of transformed phenotype in HIV <i>tat</i> gene-transfected cells	A. G. KORCHINSKY AND R. S. STOIKA	539S
Characterization of human factors required for base excision repair of uracil-containing DNA	I. D. NICHOLL, K. NEALON AND M. K. KENNY	539S
Effect of increased metallothionein content of CHO cells on DNA damage induced by copper or iron	S. M. WALLACE, J. R. ARTHUR AND I. BREMNER	539S
Superoxide dismutases and aging in yeast	K. A. SMART, D. J. JAMIESON AND M. G. BARKER	540S
Actin and oxidative stress	G. CAPPELLETTI, M. G. MAGGIONI AND R. MACI	540S
Active oxygen-mediated chromosomal 1 ~ 2 Mbp giant DNA fragmentation leading to apoptosis in rat glioma cells treated with glutamate	Y. HIGUCHI AND S. MATSUKAWA	540S
Rapid and specific efflux of reduced glutathione (GSH) during apoptosis	D. J. VAN DEN DOBBELSTEEN, C. S. I. NOBEL, I. A. COTGREAVE, S. ORRENIUS AND A. F. G. SLATER	540S
Activation of phagocytes 'respiratory burst' by zymosan containing various metal ions	E. V. MIKHALCHIK, V. A. LIPATOVA AND E. A. OSTRACHOVITCH	541S
Increased oxidant resistance of cultured human mesothelioma cells <i>in vitro</i>	V. L. KINNULA, K. RAVIO, K. KAHLOS, K. KINNULA AND K. LINNAINMAA	541S
Involvement of cellular redox state in cell survival and neuronal differentiation in PC12 cells	H. KAMATA, C. TANAKA, H. YAGISAWA, S. MATSUDA, Y. GOTOH, E. NISHIDA AND H. HIRATA	541S
Prevention of iron- and copper-dependent, hydroxyl-radical-mediated DNA fragmentation by QUIN2	L. MILNE, S. Y. TSANG AND M. J. BURKITT	541S
A role for glutathione in fibroblast-promoted T-cell survival	H. HYDE, M. SALMON AND A. N. AKBAR	542S
The effects of the sigma ligand JO-1784 administration on superoxide dismutase activity in the rodent brain after TMT intoxication	D. NOONAN, S. O'MAHONY AND B. E. LEONARD	542S
Cellular stress and phospholipase D activity: effect of γ -radiation on animal cells	M.-U. CHOI, M. J. KIM, J. W. SOHN AND M.-S. CHOI	542S
The role of haemoglobin pathology in the induction of lipid peroxidation in fish under intoxication	Y. LEUS, A. SMOLSKY AND V. GRUBINKO	542S
The assessment of metabolism damage in fish brain cells according to the glutamine transformation rate	V. GRUBINKO	543S
A cytosolic phospholipase A2 induced by methyl mercury in rat liver	D. S. NA, D. H. HUH, M. R. CHIN, D. H. SOHN AND D. K. KIM	543S
The influence of γ -radiation on hypersensitive reaction of <i>Nicotiana glauca</i> plant	J. V. SHILINA, A. N. MIKHEEV, M. I. GUSCHA AND D. M. GRODZINSKY	543S

The constitutive expression of the 27 kDa heat-shock protein in L929 cells affects cell morphology and cytoskeletal organization and enhances TNF- α cytotoxicity	N. MAIRESSE, D. BERNAERT, B. ROBAYE AND P. GALAND	543S
Involvement of growth factors in cell response to heat shock	V. BURAVSKY, G. SHPAK, R. GRONSKAYA AND I. LUKASHEVITCH	544S
pH-dependent DNA breakage in permeabilized human fibroblasts	S. CZENE AND M. HARMS-RINGDAHL	544S
Peroxynitrite formation and mitochondrial calcium efflux may be involved in cell death caused by the parkinsonian neurotoxin MPP ⁺	M. A. PACKER AND M. P. MURPHY	544S
Mitochondrial turnover and degradation during apoptosis in PC12 cells	M. P. MURPHY, J. L. SCARLETT AND M. A. PACKER	544S
Oxidative stress in septic patients	J. NETH, C. SPIES, S. BELLER AND W. SCHAFFARTZIK	545S
Oxidative stress in patients after elective surgery	J. NETH, C. SPIES, S. BELLER AND W. SCHAFFARTZIK	545S

Cell growth, control and development – differentiation and exit from the cell cycle in vertebrates

Speaker abstracts

How do stem cells decide what to do?	T. M. DEXTER	547S
Myogenic determination in mammals	M. BUCKINGHAM, G. COSSU, S. DI DONNA, R. KELLY, D. ROCANCOURT AND S. TAJBAKHSI	547S
Studies of cell aging and immortalization	O. M. PEREIRA-SMITH	547S

Poster abstracts

The fate of CD34 hematopoietic progenitor cells in differentiation and proliferation is dependent upon growth-factor-induced expression of p27 ^{kip-1} as the checkpoint of cell-cycle progression	R. HUSS	549S
Eye development in the cavefish <i>Astyanax</i> : role of programmed cell death and the <i>Pax-6</i> gene	W. R. JEFFERY, K. HORNADAY AND D. P. MARTASIAN	549S
The differential role of phospholipase A ₂ on HL-60 cell proliferation and differentiation processes	Y. LIU AND R. LEVY	549S
The activity of interferon- γ is dependent on sequestration by cell-surface heparan sulphate	M. S. DOUGLAS, D. A. RIX, D. TALBOT AND J. A. KIRBY	550S
Evidence for a role for p16 in replicative senescence and immortality in human keratinocytes	Ö. LOUGHRAN, A. MALLIRI, D. OWENS, B. OZANNE, M. FRAME AND E. K. PARKINSON	550S
Effect of short- and long-term adrenergic stimulation on the expression of the uncoupling protein thermogenin (UCP) in brown adipocyte precursor cells differentiating in culture	D. HERRON, S. MARIGA, P. PUIGSERVER, B. CANNON AND J. NEDERGAARD	550S
Reduced expression of tissue transglutaminase in a human endothelial cell line leads to changes in cell spreading and cell adhesion	R. A. JONES, B. L. NICHOLAS, S. MIAN AND M. GRIFFIN	550S
Role of cyclooxygenase 2 in 3T6 fibroblasts proliferation	J. J. MORENO, J. MARTÍNEZ AND T. SANCHEZ	551S
Cytological changes of rabbit lens epithelial cells induced by macrophage migration inhibitory factor	D. SINHA, V. PARALKAR, N. ESUMI AND G. WISTOW	551S

Interferon- γ induces a dual and alternative early biological response in neuroblastoma cells: differentiation and apoptosis	P. G. MONTALDO, V. CHIESA, M. BADO, L. RAFFAGHELLO, C. ROZZO AND M. PONZONI	551S
Sister chromatid exchange and melanogenesis in human melanoma cells	M. MIRANDA, C. LIGAS, F. AMICARELLI, O. ZARIVI, F. BRISDELLI, E. D'ALESSANDRO AND A. POMA	551S
Switch in cross-talk of β and α_1 adrenoceptors in cultured brown fat cells	G. BRONNIKOV, H. BISWAS, S.-J. ZHANG, J. NEDERGAARD AND B. CANNON	552S
Acylphosphatase level in K562 cells is correlated with differentiation	G. RAUGEI, P. CHIARUGE, D. DEGL'INNOCENTI, A. BERTI, L. TADDEI, S. RIGACCI AND G. RAMPONI	552S
Growth and differentiation of immortalized human skin keratinocytes (HaCaT) in organotypic culture	V. M. SCHOOP, H. J. STARK AND N. E. FUSENIG	552S
The influence of fetal calf serum on antigenicity of hepatoma cells	V. BUKELSKIENÉ, R. BURBULYTÉ AND V. DOMKUS	552S
Cyclic AMP-dependent induction of differentiation in rat C6 glioma	H. SLEGERS, K. ANCIAUX AND S. NICOLAI	553S
Enhancement of microsomal 1-acyl-sn-glycero-3-phosphocholine acyltransferase activity in rat submandibular gland during postnatal growth	Y. KAMEYAMA, K. YASHIRO, M. MIZUNO-KAMIYA AND A. FUJITA	553S
Cyclic AMP promotes pre-adipocyte differentiation and activates p42 and p44 MAP kinases in 3T3-F442A cells	S. J. YARWOOD, E. KILGOUR AND N. G. ANDERSON	553S
Stabilization of H-ferritin mRNA in human THP-1 cells following differentiation towards macrophages	J. H. PANG AND L.-Y. CHAU	553S
Differentiation and proliferation characteristics of human satellite cells isolated from donors of different ages	S. DECARY, V. MOULY, A. SAUTET, J. P. BARBET AND G. S. BUTLER-BROWNE	554S
Neuronal differentiation of Neuro 2A cells by the cell-cycle inhibitors lactacystin (proteasome inhibitor) and trichostatin A (histone deacetylase inhibitor)	H. TANAKA, M. KATAGIRI, S. ARIMA, J. INOKOSHI, K. MATSUZAKI, M. HAYASHI AND S. OMURA	554S
Lack of correlation between changes in plasma membrane fluidity and inhibition of cell growth induced by anthracyclines in immortal rodent cells	A. KOCEVA-CHYLA, K. GWOZDZINSKI, M. MODERSKA AND Z. JOZWIAK	554S
Is S-100 β one of the target proteins for Z-Leu-Leu-Leu-CHO, a neurite outgrowth-inducing peptide derivative?	H. KASAI, T. ANDO, Y. YOSHIKAWA, O. YOTUYA AND H. ITO	554S
Cyclin-dependent kinase inhibitors during postnatal development of the rat	K. GÜLTIG, M. KNIPPER, T. BURK, H. P. ZENNER AND H. LÖWENHEIM	555S
Human osteosarcoma (Hos TE-85) cells undergo an apoptotic process that is inhibited by IGF-I	M. E. NUTTALL AND M. GOWEN	555S
Cell death in mouse and chick embryo adrenals	T. A. O. BA-OMAR AND J. R. DOWNIE	555S
Cell differentiation is associated with DMSO-induced programmed cell death	O. TRUBIANI, M. CIANCARELLI AND R. DI PRIMIO	555S
Activation of telomerase following viral gene expression in human epithelial cells	J. K. MCDUGALL AND A. J. KLINGELHUTZ	556S

Cell death mechanisms – strategies and effectors		
Speaker abstracts		
Control of cell numbers in the developing nervous system	Y.-A. BARDE	557S
Role of proteinases in nuclear changes during apoptosis	W. C. EARNSHAW, M. MARTINS AND A. TAKAHASHI	557S
Phagocyte recognition of cells undergoing apoptosis	J. SAVILL	557S
Poster abstracts		
Cleavage of more than one ICE homologue is required for the execution of apoptosis	M. MACFARLANE, K. C. CAIN, S. C. CHOW AND G. M. COHEN	559S
Association of several nuclear matrix proteins with granular and threaded nuclear bodies in different cell lines undergoing apoptosis	A. M. MARTELLI, B. BORTUL, S. LACH, V. GRILL, R. BAREGGI, N. NARDUCCI AND M. ZWEYER	559S
Retinoids, thymosins, actin and apoptosis	A. K. HALL	559S
DNase II importance during lens differentiation and retina apoptosis	M. F. COUNIS, E. CHAUDUN, F. CHANY, Y. COURTOIS, J. C. JEANNY AND A. TORRIGLIA	559S
Effect of UV-induced apoptosis on HeLa cell-surface protease activity	T. J. PIVA, D. R. KRAUSE, G. M. CHOJNOWSKI AND K. A. O. ELLEM	560S
The effect of extracellular ATP on the actin cytoskeleton of hepatocytes	I. MEIJERMAN, W. M. BLOM AND J. F. NAGELKERKE	560S
Apoptotic pathways, which are either blocked or induced by actinomycin D, involve elevated levels of <i>nbl</i> expression	HO. NAORA, T. NISHIDA, Y. SHINDO, M. ADACHI AND HI. NAORA	560S
Role of purinergic receptors in cell death and cytokine release in the immune system	D. FERRARI, M. VILLALBA, P. CHIOZZI, M. DAL SUSINO, S. FALZONI, P. RICCIARDI-CASTAGNOLI AND F. DI VIRGILIO	560S
Effect of emptying endoplasmic reticulum (ER) calcium stores on neuronal metabolism	W. PASCHEN, J. DOUTHEIL AND C. GISSEL	561S
Endoplasmic reticulum (ER) calcium as modulator of neuronal protein synthesis	J. DOUTHEIL, C. GISSEL AND W. PASCHEN	561S
Functional aspects of isolated neuron death occurring spontaneously or under energy metabolism deterioration	A. B. UZDENSKY	561S
Heparin induces apoptosis in human peripheral blood neutrophils	J. MANASTER, R. SHURTZ-SWIRSKI, G. SHAPIRO, Y. TENDLER, B. KRISTAL, S. M. SHASHA, S. SELA AND J. CHEZAR	561S
The anti-resorptive drug clodronate is metabolized to a non-hydrolysable ATP analogue by mammalian cells <i>in vitro</i>	J. C. FRITH, R. GRAHAM, G. RUSSELL, G. M. BLACKBURN, D. J. WATTS AND M. J. ROGERS	562S
TPA did not inhibit ceramide-induced apoptosis in lymphoblastoid cell CEM	M.-Z. LAI AND S.-C. HSU	562S
Neurotrophins protect cerebellar granule neurons against cell death: possible signalling mechanisms involved	E. T. COFFEY, K. E. O. ÅKERMAN AND M. J. COURTNEY	562S
Selective killing of transformed cells by a viral cytotoxic product	S. MOUSSET, F. ANOUJA, A. OP DE BEECK AND P. CAILLET-FAUQUET	562S
Inhibition of apoptosis by prevention of CPP32 processing – a study of ICE-like protease activity and its inhibition using an <i>in vitro</i> system	E. A. SLEE, M. MACFARLANE, H. ZHU, S. C. CHOW AND G. M. COHEN	563S

Defining commitment to dexamethasone-induced apoptosis	R. H. GUNBY, C. L. BRUNET, J. A. HICKMAN AND G. BRADY	563S
Nuclear localization of a proteasome ATPase subunit associated with programmed cell death	P. LÖW, K. BUSSELL, S. P. DAWSON, R. J. MAYER AND S. E. REYNOLDS	563S
Cleavage of filaments and an enhanced activation of the proteasome determine the shape of cell death	F. OBERHAMMER, K. HOCHEGGER, G. FRÖSCHL, A. HUBBARD AND G. BAYETT	563S
Studies on the mode of action of a group of novel DNA minor-groove-binding alkylators	G. WHITESIDE AND L. R. FERGUSON	564S
Estimation of poly(ADP-ribose) polymerase cleavage as a reliable indicator of programmed cell death during development	J. A. APPERLY, M. D. JACOBSON AND M. C. RAFF	564S
The study of tissue transglutaminase functions by regulated expression in Swiss 3T3 fibroblasts	E. VERDERIO, B. L. NICHOLAS AND M. GRIFFIN	564S
Parameters determining highest transfection frequencies in CEM-C7 lymphoid cells	L. C. SUTHERLAND, S. K. GANDERTON AND G. T. WILLIAMS	564S
Differential activation of PKC β and δ isoforms during induction of neutrophil apoptosis	J. PONGRACZ AND J. M. LORD	565S
Degradation of topoisomerase II α during adenovirus E1A-induced apoptosis is mediated by the activation of the ubiquitin proteolysis system	T. NAKAJIMA, K. MORITA, N. OHI, T. ARAI, N. NOZAKI, A. KIKUCHI, F. OHSAKA, F. YAMAO AND K. ODA	565S
The engulfment of apoptotic corpses by macrophages requires the function of the ATP-binding-cassette transporter ABC1	M. F. LUCIANI, C. BROCCARDO, Y. HAMON, F. BECQ AND G. CHIMINI	565S
Specific cleavage of hnRNP C proteins in apoptosis	D. WATTERS, N. WATERHOUSE, S. KUMAR, L. SPARROW, P. STRIKE AND M. LAVIN	565S
Cell death and the role of endogenous FGFI and 2 during embryonic chick retina differentiation	J. C. JEANNY, L. DÉSIRÉ, G. RAGUENEZ, N. A. FAYEIN, M. HEAD AND Y. COURTOIS	566S
Thapsigargin induces apoptosis and inducible NO synthase expression in cultured rat mesangial cells	A. M. RODRÍGUEZ-LÓPEZ AND J. M. LÓPEZ-NOVOA	566S
<i>In vitro</i> and <i>in vivo</i> effects of some non-competitive AMPA antagonist 2,3-benzodiazepines (GYKI 52466-HCl, 53405, 53655)	A. D. KOVÁCS, G. GIGLER, Z. SZÜCS, I. GACSÍTYI, T. SZABADOS AND G. SZABÓ	566S
Fodrin cleavage and phosphatidylserine exposure in apoptosis: regulation by proteases	M. I. PÖRN, D. M. VANAGS, S. COPPOLA AND S. ORRENIUS	566S
Molecular and functional analyses of the glutamate receptor channel subunits expressed in baculovirus and herpesvirus vector systems	S. KAWAMOTO, S. HATTORI, K. XIN, S. UCHINO, J. FUKUSHIMA, K. HAMAJIMA, K. SAKIMURA, Y. NOISHIKI, S. OHNO, M. MISHINA AND K. OKUDA	567S
Role of apoptosis in the regulation of brown adipose tissue hyperplasia	J. SVENSSON AND S. REHNMARK	567S
A novel filter-binding assay to measure internucleosomal DNA fragmentation	J. D. ERUSALIMSKY, J. JOHN AND M. MOORE	567S
Protease inhibition dissociates recognition by macrophages from other features of constitutive apoptosis in the neutrophil	B. KNEPPER-NICOLAI, S. B. BROWN AND J. SAVILL	567S

Constitutive apoptosis in neutrophils does not exhibit characteristics of Fas-mediated death	S. B. BROWN, B. KNEPPER-NICOLAI AND J. SAVILL	568S
Multiple pathways for apoptotic nuclear fragmentation	L. DINI, S. COPPOLA, M. T. RUZITTU AND L. GHIBELLI	568S
Non-oxidative loss of glutathione in apoptosis via GSH extrusion	L. GHIBELLI, C. FANELLI, S. COPPOLA, G. ROTILIO, E. LAFAVIA, V. MARESCA AND M. R. CIRIOLO	568S
Molecular studies of apoptosis induced by anti-resorptive bisphosphonate drugs	M. J. ROGERS, K. M. CHILTON, S. P. LUCKMAN, R. GRAHAM, G. RUSSELL AND F. P. COXON	568S
Effect of zinc and cadmium on the apoptotic Ca ²⁺ -dependent endonuclease	R. D. LOHMANN AND A. KORTENKAMP	569S
Chromatin condensation during apoptosis requires ATP	G. E. N. KASS, J. E. ERIKSSON, M. WEIS, R. HINTON, S. ORRENIUS AND S. C. CHOW	569S
Isolation of apoptosis-related genes in the rat ovary	B. ASSARSSON, H. THELANDER AND H. BILLIG	569S
Apoptosis in rat granulosa cells: dependent on differentiation and cell culture density	E. SVENSSON, M. UTTER, H. THELANDER AND H. BILLIG	569S
PKC isoforms expression during apoptosis	O. TRUBIANI, M. RAPINO AND R. DI PRIMIO	570S
Lipid membrane modifications as an early marker of apoptosis	F. RENÒ, S. BURATTINI, A. DI BALDASSARRE, E. FALCIERI AND S. PAPA	570S
GMF as bifunctional regulator of MAP kinase and promoter of apoptosis	R. LIM AND A. ZAHEER	570S
SIF cells in autonomic ganglia: cellular death and proliferation	A. S. PYLAEV, L. A. KNYAZEVA, W. HEMING, S. A. GAMAN AND I. G. CHARYEVA	570S
Genome structure and mapping of human FADD, an intracellular mediator of lymphocyte apoptosis	P. K. KIM, A. DUTRA AND J. M. PUCK	571S
Proenkephalin, a regulator of cell death and survival, is localized to several distinct cell compartments during eye lens cell differentiation and colocalizes with p53 in the lens fibre cell nucleus	L. COPELAND, C. SPRAGGON, D. A. DEWAR, B. A. SPRUCE AND A. PRESCOTT	571S
Nuclear proenkephalin induces cell death in a p53-dose-dependent manner	D. A. DEWAR, C. SPRAGGON, C. MIDGELEY, D. LANE, A. PRESCOTT AND B. A. SPRUCE	571S
Dynamics of tumour necrosis factor α -induced cell death. Correlation of morphological changes with DNA fragmentation in the cells cultivated <i>in vitro</i>	M. ČERVINKA, Z. ČERVINKOVÁ AND M. ŠINKORA	571S
Cloning of an apoptosis-specific gene	E. M. HAMMOND AND R. J. A. GRAND	572S
Characterization of ICE-like proteolytic activity in apoptotic human monocytic tumour (THP.1) cells	K. C. CAIN, M. MACFARLANE AND G. M. COHEN	572S
Staurosporine induces apoptosis in primary hepatocytes by the activation of interleukin-1 β -converting enzyme (ICE)-like proteases	C. COUET, S. H. INAYAT-HUSSAIN AND K. CAIN	572S
TGF- β_1 -induced apoptosis in hepatocytes involves activation of interleukin-1 β -converting-enzyme-like protease(s)	S. H. INAYAT-HUSSAIN, C. COUET, G. M. COHEN AND K. CAIN	572S
Micronucleation, an incomplete form of apoptosis?	M. ABEND AND D. VAN BEUNINGEN	573S

Semliki-Forest-virus-induced programmed cell death	T. E. ALLSOPP, G. SHAH, G. POIRIER, M. SCALLAN AND J. K. FAZAKERLEY	573S
v-Crk, an effector of the nerve growth factor signalling pathway, delays apoptotic cell death in neurotrophin-deprived PC12 cells	R. H. GLASSMAN, B. L. HEMPSTEAD, H. HANAFUSA AND R. B. BIRGE	573S
Relationship between polyamine efflux and apoptosis	G. S. LINDSAY AND H. M. WALLACE	573S
Lack of butyrate is associated with induction of Bax and subsequent apoptosis in the proximal colon of guinea pig	R. BUSCHE, R. HASS, E. REALE, L. LUCIANO AND W. V. ENGELHARDT	574S
Ca ²⁺ influx through glutamate-receptor-associated channels in retina cells correlates with neuronal cell death	I. L. FERREIRA, C. B. DUARTE AND A. P. CARVALHO	574S

Signal termination and compartmentalization – compartmentalization in signalling

Speaker abstracts

Targeted calcium as a signal for cell activation and defence	A. K. CAMPBELL, C. M. REMBOLD, M. N. BADMINTON, J. M. KENDALL, G. B. SALA NEWBY, K. M. TAYLOR, J. WAUD, R. L. DORMER, H. L. RODERICK AND D. H. LLEWELLYN	575S
Use of transformed and targeted aequorin to analyse signal transduction through calcium in plant cells	A. TREWAVAS, A. CAMPBELL AND M. KNIGHT	575S
Regulation of G-protein-mediated signalling by regulatory proteins	M. J. LOHSE	575S
Subcellular targeting of kinases and phosphatases	J. D. SCOTT	575S
Protein kinase and phosphatase cascades: their roles in regulating signal transduction	J. E. DIXON	576S
Protein serine/threonine phosphatases: their role in regulating signal transduction	P. T. W. COHEN	576S

Poster abstracts

Astonishingly remarkable parallelism in induction of different defence reactions in <i>Allium cepa</i> cell culture	J. V. DYACHOK, A. P. DMITRIEV AND O. M. DYACHOK	577S
Changes of calcium level under altered gravity may influence the cytoskeleton of plant cells	G. V. SHEVCHENKO	577S
Alterations of calcium homeostasis by heavy metals: a ¹⁹ F-NMR spectroscopy study	J. BENTERS, U. FLÖGEL, S. HECHTENBERG, T. SCHÄFER, D. LEIBFRITZ AND D. BEYERSMANN	577S
Inhibition of adenylate cyclase activity by $\beta\gamma$ dimers of stimulatory G-protein: model-based reinterpretation	A. JUŠKS	577S
Sphingosine-1-phosphate and sphingosylphosphorylcholine modulation of Ca ²⁺ signalling in airway epithelial cells	S. ORLATI AND M. RUGOLO	578S
The role of protein kinase cascades and proto-oncogene expression and activation in the inhibition by cAMP of PDGF and PMA-induced human fibroblast growth	M. BURTON, M. VAN STEENBRUGGE AND M. RAES	578S
Metallothionein isoform mRNA compartmentalization: role of 3'-untranslated region and cytoskeleton	P. MAHON, J. BEATTIE, L. A. GLOVER AND J. HESKETH	578S
Regulation of inositol-specific phospholipase C γ 1 expression during cell growth inhibition in human T-lymphocytes	S. MISCIA, A. DI BALDASSARRE, F. GUIDO, D. CALOGIURI AND A. CATALDI	578S

A new biological database	H. LORINO, C. MARIETTE, P. ROUET AND M.-P. JUNIER	579S
Protein kinase C-mediated regulation of actin dynamics in growth cones and neuroblastoma cells	H. RÖSNER	579S
'Oxidative burst' of peripheral blood neutrophils, modulated by agents, which activates different signalling systems	L. KLIMKANE, V. LIEPA AND G. ZAKENFELDS	579S
The PKC-independent actions of Ro-31-8220 help define the role of ERK and JNK in immediate early gene expression	J. BELTMAN, F. MCCORMICK AND S. COOK	579S
Differential requirement for the MEK/ERK cascade in regulating Fos and Jun expression by LPA and EGF in Rat-1 cells	S. COOK, J. BELTMAN, M. MCMAHON AND F. MCCORMICK	580S
Compartmentalization of cAMP-protein kinase A (PKA) signalling by isozymes PDE-IV and PDE-III in rat mesangial cells	T. P. DOUSA, C. S. C. CHINI, E. N. CHINI, Y. TSUBOI AND J. P. GRANDE	580S
TGF- β 1 activates Ras, MEK and MAPK in hepatic perisinusoidal cells	T. REIMANN, U. HEMPEL, S. KRAUTWALD AND K. W. WENZEL	580S
Protein kinase C-dependent activation of Raf-1 by TGF- β 1 in lung fibroblasts	T. REIMANN, D. SEIDEL, S. KRAUTWALD AND K. W. WENZEL	580S
Chemoattractants activate ERK2 in <i>Dictyostelium discoideum</i> by diverse signalling pathways	C. KOSAKA AND C. PEARS	581S
α -interferon-dependent signalling modulates 47 kDa sterol-regulatory-element-binding protein factor (SREBF) involved in LDL-receptor gene transcription in CML patients	G. RAJEEV, S. VARMA AND D. KAUL	581S
Transfection of C6 glioma cells with antisense constructs of protein kinase C isozymes: effects on cell growth and morphology	G. S. BEALE, L. DREW AND M. G. RUMSBY	581S
Rapid synthesis of protein kinase C- ϵ in newly seeded Swiss 3T3 and 3T6 fibroblasts is under translational control	J. A. WATSON, P. LITTLEBURY, N. GROOME AND M. G. RUMSBY	581S
Regulation of cAMP-potentiated insulin secretion from pancreatic islet β -cells through phosphodiesterase (PDE)3B	A. Z. ZHAO AND J. A. BEAVO	582S
A CaM-dependent phosphodiesterase (PDE1C) is induced in human arterial smooth-muscle cells during transition from intact aorta to cell culture	S. D. RYBALKIN, W. K. SONNENBURG, J. A. BEAVO AND K. E. BORNFELDT	582S
Localization, regulation and function of cyclic nucleotide phosphodiesterases	J. A. BEAVO	582S
Total calcium mapping in PC12 cells by electron spectroscopic imaging	R. PEZZATI, J. MELDOLESI AND F. GROHOVAZ	582S
Pleckstrin homology domain of phospholipase C- δ 1: its importance in <i>Ins(1,4,5)P₃/PtdIns(4,5)P₂</i> binding, enzymic activity and translocation	H. YAGISAWA, K. SAKUMA, Y. TAMAOKA, T. MIZOBATA, M. FUJII, H. KAMATA, M. HIRATA AND H. HIRATA	583S
Dephosphorylation of the C1b region of adenylate cyclase type 9 by calcineurin	J. M. PATERSON, J. SIMPSON AND F. A. ANTONI	583S

Different effects of EGF on PKC isoform in chick embryo hepatocytes	S. LEONI, M. MARINO, R. MELE, S. SPAGNUOLO AND M. T. MANGIANTINI	583S
---	--	-------------

Cellular fates of proteins – protein targeting and translocation

Speaker abstracts

Components of the protein translocation complex in the endoplasmic reticulum (ER) membrane	E. HARTMANN	585S
A molecular dissection of vesicle targeting and fusion	S. STONE, M. SACHER, Y. JIANG, Y. MAO, P. LYONS, E. FELICIANO AND S. FERRO-NOVICK	585S
Vesicle-targeting molecules	H. PELHAM, M. LEWIS AND J. RAYNER	585S
GTPases: molecular sensors regulating bi-directional transport between the endoplasmic reticulum and the Golgi	W. E. BALCH, T. ROWE, M. ARIDOR, S. BANNYKH AND H. PLUTNER	585S
Protein sorting and clathrin-coated vesicle formation in the <i>trans</i> -Golgi network	B. HOFACK	586S
How cells instruct the immune system for their suicide	M. FERNANDEZ-BORJA AND J. NEEFJES	586S

Poster abstracts

Cytochrome <i>c</i> targeting and translocation in bacteria	N. SINHA AND S. J. FERGUSON	587S
Study on the active site in yeast farnesyl protein transferase	C. H. YANG, Y. J. BAK, H. CHOI, H. KWON AND S. W. SOHN	587S
Characterization of mutant geranylgeranyl transferase type I β subunit of yeast	C. H. YANG AND H. K. KIM	587S
hTom34: a translocase for the import of proteins into human mitochondria	S. D. NUTTALL, B. J. HANSON AND N. J. HOOGENRAAD	587S
Isolation of a gene fragment encoding the human mitochondrial serine hydroxymethyltransferase mitochondrial signal sequence and comparison with the rabbit sequence	S. K. WHITEHOUSE, P. G. SANDERS AND K. SNELL	588S
Isolation of clones interacting with RanBP1 in the two-hybrid screen	R. DEANE, H.-P. ZIMMERMANN, L. MUELLER AND H. PONSTINGL	588S
Ric1, a RCC1-interacting clone, encodes a nuclear protein containing FXFG motifs	L. MUELLER, V. C. CORDES, F. R. BISCHOFF AND H. PONSTINGL	588S
Demonstration of the presence of small GTP-binding proteins in cells isolated from the rat jejunum	J. G. COMERFORD, L. FULLBROOK, P. MEYTHA, A. H. WILSON AND P. J. AGGETT	588S
Use of a fusion protein as a means of localizing of tissue transglutaminase	C. A. GAUDRY, E. VERDERIO AND M. GRIFFIN	589S
The roles of Rab3A and Rab3B in the secretion of gonadotrophin by α T3-I cells	A. BETTERIDGE AND P. MUCKLEY	589S

Cell death mechanisms – apoptosis and pathology

Speaker abstracts

Apoptosis in bacterial pathogenesis	A. ZYCHLINSKY	591S
-------------------------------------	---------------	-------------

Regulation of cell death during multistep carcinogenesis	T. J. McDONNELL, A. BEHAM, J. HERRMANN, M. C. MARIN, P. WESTIN, S. BRISBAY AND E. BRUCKHEIMER	591S
Ceramide signalling in apoptosis	Z. FUKS	591S
Fas, <i>Dictyostelium</i> , cell death and evolution	P. GOLSTEIN	591S
Structure–function investigations of Bcl-2-family proteins	J. C. REED	592S
Regulating and replacing suppressor gene function with small synthetic molecules; design of an active synthetic suppressor protein	D. P. LANE, T. HUPP, E. WARBRICK, S. PICKSLEY, A. SPARKS, R. FARHEUS, J. PARAMIO, K. BALL, S. LAIN, D. GLOVER AND P. HALL	592S
Poster abstracts		
Activation or apoptosis decisions in developing T- and B-lymphocytes	C. G. H. BELL	593S
Induction of apoptosis in tumour cells: one of the mechanisms mediating spontaneous tumour regression	A. KHAR, B. V. V. PARDHASARADHI, C. VARALAKSHMI, A. MUBARAK ALI, A. LEELA KUMARI AND P. GOPALAKRISHNA	593S
Differential regulation of <i>bcl-2</i> and <i>c-fos</i> genes by HIV-1 Tat protein in serum-starved and activated lymphoid T-cells	G. ZAULI, D. GIBELLINI, C. CELEGHINI AND S. CAPITANI	593S
Metabolic disturbances in cells loaded with non-hydrolysable endogenous and exogenous substances	T. S. IVLEVA	593S
Glucocorticoid-provoked apoptosis in rat Nb2 T-lymphoma: inhibition by growth-factor-induced <i>bcl-2</i> and <i>pim-1</i>	A. R. BUCKLEY, D. J. BUCKLEY, M. A. LEFF, N. S. MAGNUSON, G. DE JONG AND P. W. GOUT	594S
Protection of mitochondrial potential loss by Bcl-2 in apoptosis and necrosis	Y. TSUJIMOTO, S. SHIMIZU AND Y. EGUCHI	594S
Estramustine induces apoptosis in malignant glioma in the clinical situation	C. VALLBO, A. T. BERGENHEIM AND R. HENRIKSSON	594S
Anti-(α 4 integrin) antibody induces apoptosis in activated murine lymph node T-cells	E. Z. TCHILIAN, J. J. OWEN AND E. J. JENKINSON	594S
Evidence for the involvement of cGMP in nitric oxide-induced apoptosis in the pancreatic islet β -cell line, HIT-T15	A. C. LOWETH, J. H. SCARPELLO AND N. G. MORGAN	595S
Sporosis: an ambiguous mode of the cell death	T. FREIVALDS, I. BUIKIS AND L. HARJU	595S
Rubratoxin B induces apoptosis in the presence and absence of internucleosomal fragmentation	H. NAGASHIMA AND T. GOTO	595S
Functional Fas receptors are expressed by human eosinophils	H. HEBESTREIT, I. BALATTI, K. BLASER AND H. U. SIMON	595S
Inhibition of calmodulin-dependent phosphodiesterase induces apoptosis in human leukaemic cells	P. M. EPSTEIN, X. JIANG, J. LI, T. GHAYER AND M. PASKIND	596S
The regulation of transcription from the human p53 promoter is differentially regulated by E1A gene products from oncogenic and non-oncogenic adenovirus subtypes	S. FLASWINKEL, H. M. RUMPF, D. BROCKMANN, H. ESCHÉ AND H.-C. KIRCH	596S
Apoptosis induced by mistletoe lectins and their lectin B chains	A. BÜSSING, K. SUZART, U. PFÜLLER AND M. SCHIETZEL	596S

Anion-exchange proteins and the life and death of the neuron	G. J. C.G. M. BOSMAN AND W. J. DE GRIP	596S
Hsp 70 is functionally and physically associated with active NF- κ B complex in human T-leukaemia cells	I. GUZHOVA, Z. DARIEVA, I. FRIDLIANSKAYA, A. ROCHA MELO AND B. MARGULIS	597S
Regulation of NF- κ B complex in normal and E1A-c-Ha-Ras-transformed rat embryo fibroblasts	Z. DARIEVA AND T. POSPELOVA	597S
The cells with high accumulation of major heat-shock protein 70kDa are more resistant to heat-shock-induced apoptosis	E. LASUNSKAYA, I. FRIDLIANSKAYA AND B. MARGULIS	597S
Mechanisms of radiation-induced death of human peripheral blood lymphocytes measured by comet assay	V. A. TRONOV AND M. A. KONOPLYANNIKOV	597S
c-Raf is downregulated rather than required for cell survival in cells overexpressing Bcl-2	M. WARTMANN, R. A. OLIVER, I. OTTER, L. MONNEY, S. STABEL AND C. BORNER	598S
Cytokine expression in progressive and non-progressive B-CLL	M. AGUILAR-SANTELISES, D. GIGLIOTTI, A. DE SANTIAGO, L. M. OSORIO, H. MELLSTEDT AND M. JONDAL	598S
Expression of p53 during neuronal death affects the neonatal transection of the infraorbital nerve on the CNS	M. W. MILLER AND P. E. KUHN	598S
Upregulation of p53 synthesis during neuronal death: association of p53 with the ALZ-50-positive fetal antigen in developing rat cerebral cortex	M. W. MILLER AND P. E. KUHN	598S
Non-genotoxic hepatocarcinogens stimulate DNA synthesis and suppress apoptosis but in different hepatocyte populations	R. A. ROBERTS, A. R. SOAMES, J. H. GILL, N. H. JAMES AND E. WHEELDON	599S
Expression and activity of p53 during long-term quiescence in human diploid fibroblasts	C. M. HULL, C. VEILLETTE AND K. RIABOWOL	599S
Induced expression of the human Bcl-2 homologue BAK in <i>S. pombe</i> leads to growth arrest and cell death – a genetic system for identifying apoptosis-inhibiting genes	M. ZOERNIG, B. INK, B. BAUM AND G. EVAN	599S
Molecular control of apoptosis in the cytokine-dependent cell line TFI	V. L. LONGTHORNE AND G. T. WILLIAMS	599S
Use of competitive PCR to monitor expression of the <i>bcl-2</i> , <i>bcl-x</i> , <i>mcl-1</i> , <i>bax</i> , <i>bak</i> and <i>bfl-1</i> genes during the induction of apoptosis in human haematopoietic cell lines	C. A. SMITH, S. K. GANDERTON, A. C. CULHANE, P. S. LEITE AND G. T. WILLIAMS	600S
Analysis of proteins that bind to Bcl-2 during apoptotic stresses	I. OTTER AND C. BORNER	600S
Toxicity or non-toxicity of sphingomyelin/n-hexane/ethanol dispersions depends on the modus of its preparation	S. G. E. MEYER, N. CARIUS, C. BRUHNKE, K. FLÜMANN, A. G. RIETVELD AND H. DE GROOT	600S
Modulation of apoptosis by inhibition of CED-3/ICE-like proteases	N. MCCARTHY, M. WHYTE AND G. EVAN	600S
Cloning of drICE, a <i>Drosophila melanogaster</i> ICE/CED-3 protease homologue	A. FRASER AND G. EVAN	601S
Involvement of the JAK/STAT signalling pathway in the erythropoietin-induced prevention of apoptosis in erythroid cell lines	B. LÜDTKE, T. BITTORF, R. JASTER, B. KAMPER AND J. BROCK	601S

Daunorubicin activates NF- κ B and potentiates TNF-induced gene expression	M. P. BOLAND AND L. A. J. O'NEILL	601S
A dichotomy of protection by Bcl-2 from mitochondrial poisons	T. P. HUTCHIN, E. WANG, D. E. BREDESEN AND G. A. CORTOPASSI	601S
Characterization of the Bcl-2-interacting protein, R-Ras	A. ECCLESTON, M. J. FERNANDEZ-SARABIA AND F. MCCORMICK	602S
Increased levels of Bcl-x _L expression correlate with rescue from apoptosis in the Burkitts-lymphoma cell line Ramos	A. HALL AND K. KNOX	602S
Expression of apoptosis-modulating genes in human multidrug-resistant cell lines	L. CONNOLLY, R. NICAMHLAIBH, S. VERHAEGEN AND M. CLYNES	602S
A radiation-resistant neuroblastoma subline displays reduced apoptosis and reduced levels of Bcl-2	J. RUSSELL	602S
Bcl-2 overexpression in CEM cells undergoing apoptosis blocks chromatin condensation and cellular fragmentation without preventing cell shrinkage or intracellular acidification	R. S. P. BENSON AND A. J. M. WATSON	603S
Signalling through CD40 synergizes with Bcl-2 to delay drug-induced apoptosis	A. WALKER, S. T. TAYLOR, C. DIVE AND J. A. HICKMAN	603S
Evidence for the expression of the Bcl-2 proto-oncogene by human cells of the osteoblast lineage	N. ARNOTT, P. CLAMMER, T. SKERRY AND J. BERESFORD	603S
TNF α +cycloheximide induce apoptosis in U937 that correlates with changes in Bcl-2/Bax α ratio and is inhibited by 5-lipoxygenase, FLAP and cPLA $_2$ inhibitors	D. M. VANAGS, P. LARSSON, S. FELTENMARK, S. COPPOLA, P. J. JAKOBSSON, S. ORRENIUS, H. E. CLAESSON AND M. AGUILAR-SANTELISES	603S
Oligodendrocyte death induced by recombinant human interleukin-2	L. CURATOLO, B. VALSASINA, C. CACCIA, G. ORSINI AND A. BIANCHETTI	604S
Involvement of p53 in DNA-strand-break-induced apoptosis in postmitotic CNS neurons	H. HATANAKA AND Y. ENOKIDO	604S
Iron and nitric oxide regulate the expression of the IFN γ receptor and the apoptosis of human neoplastic T-cells	A. ALLIONE, G. P. PESCARMONA, P. BERNABEI, L. RIGAMONTI, G. FORNI AND F. NOVELLI	604S
The control of apoptosis in effector T-cell populations from patients with viral infections by IL-2R γ chain signalling	N. J. BORTHWICK, M. BOFILL, R. G. WICKREMASINGE, P. PANIOTYDIS, I. HASSAN, M. SALMON AND A. N. AKBAR	604S
Regulation of apoptosis in resting T-lymphocytes	D. PILLING, A. N. AKBAR AND M. SALMON	605S
l-asparaginase-induced apoptosis in human fibrosarcoma cells: involvement of p53 and myc	V. DALL'ASTA, S. BELLETTI, J. UGGERI, R. VISIGALLI, R. GATTI, G. ORLANDIDNI, R. SALA, O. BUSSOLATI AND G. C. GAZZOLA	605S
Influence of aging on B-cell apoptosis and expression of alkaline phosphatase	V. SOUVANNAVONG, C. LEMAIRE, K. ANDRÉAU, S. BROWN AND A. ADAM	605S
Induction of apoptosis by quercetin in primary leukaemic blasts: involvement of heat-shock protein 70	L. M. LAROCCA, L. TEOFILI, N. MAGGIANO, M. PIANTELLI, E. ORTU LA BARBERA, S. RUTELLA, F. O. RANELLETTI AND G. LEONE	605S
Selective regression of liver tumours by apoptosis due to an inherent acceleration of cell turnover	B. GRASL-KRAUPP, L. MÜLLAUER, B. RUTTKAY-NEDECKY, H. TAPER, W. BURSCH AND R. SCHULTE-HERMANN	606S

Suppression of apoptosis by phenobarbital, a non-genotoxic carcinogen: implications for hepatocarcinogenesis	A. LÖW-BASELLI, B. GRASL-KRAUPP, A. WAGNER AND R. SCHULTE-HERMANN	606S
Eicosapentanoic acid reduces total cell number in the colorectal tumour cell line HT29, initially by inducing apoptosis	P. BANOUB, D. FYFE, A. WILSON, I. T. JOHNSON AND E. K. LUND	606S
Allyl isothiocyanate induces apoptosis in HT29 cells <i>in vitro</i> and in the colonic crypt cells of DMH-treated rats	T. SMITH, E. K. LUND AND I. T. JOHNSON	606S
Flow cytometric analysis of apoptotic lymphocytes with annexin V and DiOC ₆ after <i>in vitro</i> irradiation	K. HERTVELDT, J. PHILIPPÉ, H. THIERENS, A. VRAL AND L. DE RIDDER	607S
Light and electron microscopy of apoptosis in irradiated human lymphocytes	M. CORNELISSEN, A. VRAL, H. THIERENS AND L. DE RIDDER	607S
Anti-apoptotic effect of prolactin in lymphoid cells	E. WEIMANN, V. GOFFIN, F. FERRAG AND P. A. KELLY	607S
Effects of 8-Cl-cAMP on cell growth, differentiation and apoptosis in Y-79 retinoblastoma cell line	G. FASSINA, M. G. ALUIGI, T. CAI AND A. ALBINI	607S
Stimulation of apoptosis by isolated bloodless perfusion in rat liver	A. AMIN, S. MOHAMMED, B. FULLER, K. SRAI, M. WINSLET AND C. J. GREEN	608S
Time-lapse videomicroscopical study of apoptosis induction to chemotherapeutic agents in the human lung carcinoma cell line DLKP	C. O'LOUGHLIN, S. VERHAEGEN, S. COYLE AND M. CLYNES	608S
Human mammary and colon carcinoma cells die by different forms of active cell death	K. HOCHEGGER, B. MARIAN, L. TÖRÖK, A. ELLINGER, W. BURSCH AND R. SCHULTE-HERMANN	608S
Tissue transglutaminase and the development of kidney fibrosis	T. S. JOHNSON, M. GRIFFIN, G. L. THOMAS, B. YANG, N. J. SKILL, A. COX, C. KUBARA AND A. M. EL HAHAS	608S
Defects in apoptosis in the thymus of a CD45 ^{-/-} transgenic mouse	L. A. CONROY, S. J. HOWLETT, K. BYTH, N. HOLMES AND D. ALEXANDER	609S
Ceramide binding and activation defines protein kinase c-Raf as a ceramide-activated protein kinase	J. PFEILSCHIFTER, J. BRUNNER, R. HUMMEL, M. VERVOORDELDONK, S. STABEL, H. VAN DEN BOSCH AND A. HUWILER	609S
Spontaneously and chemically induced cell death in isolated rat lung cells	N. M. JOHNSEN, P. E. SCHWARZE, R. WIGER, M. REFSNES, M. LÄG, E. V. THRANE, R. BECHER AND J. A. HOLME	609S
Alterations in nuclear chromatin related to apoptosis induced by the drinking-water mutagen MX in HL-60 cells	R. WIGER, U. MARSTEINSTREDET, G. BRUNBORG, J. K. HONGSLO AND J. A. HOLME	609S
Effects of eicosanoids on hepatic canalicular accumulation	A. A. HORTON, S. HUTCHINSON, T. G. HAMMOND AND R. COLEMAN	610S
Induction of apoptosis in human peripheral lymphocytes by the tricyclic antidepressants imipramine, clomipramine and citalopram	Z. XIA, H. KARISSON, J. W. DEPIERRE AND L. NÄSSBERGER	610S
Cell-adhesion pattern of squamous carcinoma cells plays a role in apoptosis induced by all- <i>trans</i> retinoic acid and interferon- α	V. GIANDOMENICO, G. FIORUCCI, Z. A. PERCARIO, R. RIVABENE, P. MATARRESE, W. MALORNI, E. AFFABRIS AND G. ROMEO	610S
Induction of apoptosis by <i>C. difficile</i> toxin B in cultured intestinal cells	C. FIORENTINI, A. FABBRI, A. FATTOROSI, L. FALZONO, P. MATARRESE, R. RIVABENE AND G. DONELLI	610S

Induction of apoptosis by a bioflavonoid, phloretin	M. KOBORI, H. SHINMOTO, T. TSUSHIDA AND K. SHINOHARA	611S
Effect of TCDD on cell division and apoptosis during hepatocarcinogenesis in the rat	A. BUCHMANN, S. STINCHCOMBE, K. W. BOCK AND M. SCHWARZ	611S
Function of a lung-fibroblast-derived protein inducer of alveolar epithelial cell apoptosis requires nitric oxide generation	B. D. UHAL, I. JOSHI, J. A. PARDO AND M. SELMAN	611S
Upregulation of the CD95 (APO-1/Fas) receptor–ligand system in peripheral blood T-cells from HIV-1-infected children and adults	T. BÖHLER, C. B. BÄUMLER, I. HERR, P. KRAMMER AND K. M. DEBATIN	611S
Membrane degradation and phospholipase D activity during developmental cell death in <i>Iris</i> flowers	T. DE VRIJE, C. VAN DER SCHOOT, C. PAK AND W. G. VAN DOORN	612S
Inhibition of (Na,K)ATPase in thymocytes reduces apoptosis induced by microtubule-disrupting agents	B. DJURIČIĆ, A. SKARO-MILIĆ, D. ARSIĆ AND V. BUMBAŠIREVIĆ	612S
Glomerular apoptosis and proliferation processes in SHR uninephrectomized rats	A. M. RODRÍGUEZ-LÓPEZ, O. FLORES, M. ARÉVALO AND J. M. LÓPEZ-NOVOA	612S
Potentialiation of the activity of nitric oxide by phorbol ester in HL-60 human myeloid cell	S.-S. KANG, C.-D. JUN, T.-K. PARK AND H.-T. CHUNG	612S
Oestrogen replacement therapy prevents bone loss, in part, by promoting osteoclast apoptosis	B. F. BOYCE, D. E. HUGHES, J. TIFFEE, H. H. LI, A. DAI AND G. R. MUNDY	613S
Induction of apoptosis in human leukaemic K562 cells by interferon- α treatment	F. LUCHETTI, A. GREGORINI, S. PAPA, M. VALENTINI, S. BURATTINI, B. CANONICO AND E. FALCIERI	613S
Apoptosis in medulloblastoma	F. PIERCONTI, A. RINELLI, M. L. TARDIO AND L. LAURIOLA	613S
T-cell-specific zinc-finger protein Gfi-1 inhibits apoptosis in response to various stimuli in cultured T-cells and thymocytes of transgenic mice	T. SCHMIDT, H. KARSUNKY AND T. MÖRÖY	613S
CD6 ligation modulates Bcl-2/Bax ratio and protects B-CLL cells from apoptosis induced by anti-IgM	L. M. OSORIO, A. DE SANTIAGO, M. AGUILAR-SANTELISES, H. MELLSTEDT AND M. JONDAL	614S
Identification of BAG-1-related protein, BAG-2, in murine cells	G. PACKHAM, M. BRIMMELL AND J. L. CLEVELAND	614S
CD95 (APO-1/Fas)-mediated apoptosis in colon epithelial cells: a pathogenetic role for the CD95/CD95 ligand system in ulcerative colitis	J. STRÄTER, I. WELLISCH, S. RIEDL, H. WALCZAK, K. KORETZ, A. TANDARA, P. H. KRAMMER AND P. MÖLLER	614S
ATP depletion inhibits thymocyte apoptosis	C. STEFANELLI, I. ROBUFFO, F. BONAVITA, I. STANIC, M. COLUMBARO, G. FARRUGGIA, C. PIGNATTI, C. ROSSONI, C. M. CALDARERA AND E. FALCIERI	614S
Determination of Bcl-2 antisense oligo uptake in peripheral blood stem-cell harvests in acute myeloid leukaemia (AML)	A. J. CUNNINGHAM, R. A. DELLOW, N. D. MCKELVIE, S. Y. ROGERS, J. I. O. CRAIG, A. C. PARKER AND R. S. ANTHONY	615S
Expression of CD95 (Fas) in peripheral blood stem-cell harvests	N. D. MCKELVIE, A. C. PARKER, A. J. CUNNINGHAM, R. A. DELLOW, J. I. O. CRAIG AND R. S. ANTHONY	615S
Early detachment of colon carcinoma cells during D95(APO-1/Fas)-mediated apoptosis. II. De-adhesion from collagen due to depletion of surface integrins by membrane blebbing	U. VON REYHER, J. STRÄTER, T. BARTH, A. R. GÜNTHERT, K. KORETZ, G. MOLDENHAUER, P. H. KRAMMER AND P. MÖLLER	615S

Early detachment of colon carcinoma cells during CD95(APO-1/Fas)-mediated apoptosis. I. De-adhesion from hyaluronate by shedding of CD44	A. R. GÜNTHERT, J. STRÄTER, U. VON REYHER, C. HENNE, S. JOOS, K. KORETZ, G. MOLDENHAUER, P. H. KRAMMER AND P. MÖLLER	615S
Characterization and use of a pluripotent islet cells line for identification of mechanisms in cytokine- and nitric oxide-mediated β -cell cytotoxicity associated with diabetes	A. E. KARLSEN, K. NIELSEN, H. U. ANDEERSEN, P. MOSE LARSEN, S. FEY, J. JENSEN, T. MANDRUP-POULSON, O. D. MADSEN AND J. NERUP	616S
Activation of Jun kinase is associated with thymocyte apoptosis	S. T. HARKIN, A. GESCHER, G. M. COHEN AND J. L. BLANK	616S
25-hydroxycholesterol induces apoptosis in human aortic smooth-muscle cells	M. P. S. ARES, M. I. PÖRN, J. THYBERG, U. DICZFALUSY, B. KALLIN, I. BJÖRKHEM, S. ORRENIUS AND J. NILSSON	616S
Lipopolysaccharide induces apoptosis in bovine pulmonary endothelial cells – a role for the ceramide pathway?	E. A. FREY AND B. B. FINLAY	616S
Phorbol ester inhibition of apoptosis	G. C. MAYNE AND A. W. MURRAY	617S
Lysosomal phospholipidosis (LPL) and apoptosis induced in cultured rat fibroblasts by aminoglycosides antibiotics (AGs) and their prevention by poly-L-aspartic acid (PAS)	M. EL MOUEDDEN, G. LAURENT, M. P. MINGEOT-LECLERQ AND P. M. TULKENS	617S
Neutrophil apoptosis in the infected lung: anti-inflammatory benefits of tilmicosin	A. BURET, D. W. MORCK, J. K. MERRILL, M. E. OLSON, H. CERI, J. ABRAHAM, S. G. MCKAY AND A. CHIN	617S
Different apoptotic pathways activated by Daunorubicin in human lymphocytes and fibroblasts	E. ALESSE, F. ZAZZERONI, P. RONCAIOLI, A. ANGELUCCI, M. GRAZIA CIFONE AND A. GULINO	617S
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)-induced thymic atrophy is mediated through apoptosis	M. NAGARKATTI, A. KAMATH AND H. XU	618S
Apoptosis induced by cytolytic T-cells and reverse apoptosis mediated by tumour cells may play a crucial role in host–tumour interactions	P. S. NAGARKATTI, A. ZEYTON AND M. HASSUNEH	618S
Ceramide-induced c-Myc downregulation involves p21 ^{WAF1} increase and Rb-hypophosphorylation in human fibroblasts	F. ZAZZERONI, E. ALESSE AND A. GULINO	618S
Effect of l-carnitine treatment <i>in vivo</i> on apoptosis and ceramide generation in peripheral blood lymphocytes from AIDS patients: correlation with <i>in vitro</i> results	M. GRAZIA CIFONE, E. ALESSE, L. DI MARZIO, P. RONCAIOLI, F. ZAZZERONI, S. MORETTI, S. MARCELLINI, E. NUCERA AND C. DE SIMONE	618S
Induction of apoptosis following proton irradiation of endothelial Cells	C. WALKER, A. KACPEREK, K. GILLET, J. PEACOCK, D. R. SIBSON AND B. JONES	619S
The expression of CD11a but not CD45RA correlates with CD95 (Fas/APO-1) expression, enhanced activation-induced apoptosis and CD55 expression in human CD8 T-cells	C. HÖFLICH, W. D. DÖCKE AND H. D. VOLK	619S
Mechanisms of complement-mediated cell death in lymphocytes and possible conditions for cytoprotection	P. NEWSHOLME, L. F. B.P. COSTA ROSA, R. F. P. BACURAU AND E. O'TOOLE	619S
Apoptosis in B16 mouse melanoma cells: ultrastructural study	A. RISTIĆ-FIRA, M. PAVLOVIĆ, N. RIBARAC-STEPIĆ, D. T. KANAZIR AND P. SPASIĆ	619S
Possible mechanisms inducing apoptosis in multicellular tumour spheroids	S. HAUPTMANN, P. HARTUNG, E. WÖLFLE, L. MUYS, B. KLOSTERHALFEN AND C. MITTERMAYER	620S

Changes in the programmed cell death of polymorphonuclear granulocytes with aging under various stimulations	T. FÜLOP JR., C. LEBLANC, C. FOUQUET AND G. LACOMBE	620S
--	---	-------------

Signal termination and compartmentalization – signal inactivation of lipid signalling processes

Speaker abstracts

The control of <i>sn</i> -1,2-diacylglycerol levels in stimulated cells	M. J. O. WAKELAM, M. N. HODGKIN, T. R. PETTITT AND A. MARTIN	621S
The regulation of inositol trisphosphate by inositol polyphosphate 5-phosphatases	C. A. MITCHELL	621S
Inositol 1,4,5-trisphosphate 3-kinase and 5-phosphatase in brain	C. ERNEUX, D. COMMUNI, F. DE SMEDT, L. DRAYER AND X. PESASSE	621S
Regulation of the adipocyte cGMP-inhibited phosphodiesterase (PDE3B) by insulin- and isoproterenol-stimulated phosphorylation	T. RAHN, E. DEGERMAN AND V. C. MANGANIELLO	621S
Gene structure, splicing variants and regulation of the cAMP-specific phosphodiesterases	M. CONTI	622S
cGMP signal termination	N. J. PYNE	622S

Poster abstracts

Post-translational modification of human brain type I inositol 1,4,5-trisphosphate 5-phosphatase by farnesylation	F. DE SMEDT, A. BOOM, X. PESASSE, S. N. SCHIFFMANN AND C. ERNEUX	623S
A novel diacylglycerol-binding protein in <i>Dictyostelium discoideum</i>	R. NICHOL, E. COGHILL, J. WILLIAMS AND C. PEARS	623S
The calmodulin-dependent phosphodiesterase gene PDE1C encodes several functionally different splice variants in a tissue-specific manner	C. YAN, A. Z. ZHAO, J. K. BENTLEY AND J. A. BEAVO	623S
Localization of PDE5 in mouse lung and brain and cloning of two mouse PDE5 isoforms	F. BURNS, K. HANSON, J. B. MILLER, S. D. RYBALKIN, W. R. CLARKE AND J. A. BEAVO	623S
Identification of a new PDE2A isoform and expression of PDE2 in a subset of olfactory neurons and gastrointestinal cells	D. M. JUILFS, W. K. SONNENBURG, S. SERAJI, H. J. FÜLLE, D. L. GARBERS, M. D. HOUSLAY AND J. A. BEAVO	624S
Sphingosine inhibits store-dependent calcium influx in CFPAC-1 cells	M. RUGOLO, M. CAVAZZONI AND S. ORLATI	624S
Underexpression of the 43 kDa inositol polyphosphate 5-phosphatase is associated with cellular transformation	C. J. SPEED, P. J. LITTLE, J. A. HAYMAN AND C. A. MITCHELL	624S
Hydrolysis of phosphatidylinositol 3,4-bisphosphate by a 4-phosphatase associated with the p85/p110 phosphoinositide 3-kinase	A. MUNDAY, S. BROWN, K. C. CALDWELL AND C. A. MITCHELL	624S
Cyclic AMP-mediated regulation of PDE3 and PDE4 expression in vascular smooth muscle: relationship to cGMP modulation of cAMP breakdown	R. J. ROSE, H. LIU AND D. H. MAURICE	625S

Cellular fates of proteins – protein folding and assembly; protein turnover and modification

Speaker abstracts

Folding of glycoproteins in the endoplasmic reticulum	I. BRAAKMAN, D. ZONNEVELD, A. LAND, J. HOFTIJZER AND J. J. L. JACOBS	627S
Assembly of mitochondrial proteins: membrane translocation, folding and degradation	W. NEUPERT	627S
Roles of importin in nucleocytoplasmic transport	D. GÖRLICH, E. IZAUERLALDE AND I. W. MATTAJ	627S
The ubiquitin system for protein degradation	A. HERSHKO	627S
Function of the proteasome in protein turnover and antigen presentation	A. L. GOLDBERG	628S
Bacterial toxins and cell membrane traffic	C. MONTECUCCO	628S
Intracellular protein synthesis, post-translational modifications and aging	B. F. C. CLARK AND S. I. S. RATTAN	628S

Poster abstracts

Collagen SLS-crystallites structure in norm and with calcium metabolism disorders	L. B. BONDARENKO	629S
Assembly of thylakoid membrane proteins	S. Y. SULEIMANOV AND I. M. GUSEINOVA	629S
Degradative signals in the annexins	J. A. BARNES AND A. V. GOMES	629S
The effect of lactacystin on antigen presentation by MHC class I molecules	A. BENHAM AND J. NEEFJES	629S
<i>In vivo</i> inhibition of dipeptidyl peptidase IV (DPP IV) by pro-pro-diphenyl phosphonate (Diprofen)	I. DE MEESTER, A. M. LAMBEIR, A. BELYAEV, M. BORLOO, G. R. Y. DE MEYER, G. VANHOOF, A. HAEMERS AND S. SCHARPÉ	630S
Regulation of the ubiquitin–proteasome system and myofibrillar protein degradation in C2C12 skeletal-muscle cells	M. G. THOMPSON, A. THOM, K. PARTRIDGE, G. CAMPBELL, K. GARDEN, G. CALDER AND R. M. PALMER	630S
Distribution of tripeptidyl-peptidase II in the central nervous system of rat	B. TOMKINSON AND F. NYBERG	630S
Proteolysis mediated by oxidative stress in mammalian cells	T. GRUNE, T. REINHECKEL AND K. J. A. DAVIES	630S
Proteolysis of nitrated proteins	N. SITTE, T. GRUNE, I. BLASIG, R. HASELOFF AND K. J. A. DAVIES	631S
Programmed neuromuscular cell death in the tobacco horn moth <i>Manduca sexta</i>	R. HASTINGS, S. P. DAWSON, K. TAKAYANAGI, M. BILLET, S. E. REYNOLDS AND R. J. MAYER	631S
Cysteine proteinases activity levels in human lung carcinoma tissues	H. İSLEKEL, Ö. OTO, G. GÜNER, E. HAZAN AND Ü. AÇIKEL	631S