

Nicola Antonio Colabufo

Bari 17 July, 1966

Associate Professor in Medicinal Chemistry

Nicola Antonio Colabufo received his Ph.D. in Medicinal Chemistry in 1996 from University of Bari, Italy. After working as a Postdoctoral Fellow in the synthesis of GPCRs ligands, he worked in biological evaluation of GPCRs and σ receptors ligands. Since 2005 he has been Associate Professor and was involved in the development of new compounds for reversal of MDR. He is author and coauthor of numerous papers in the MDR field, edited a text book on MDR in antitumor treatment (ResearchSignPost), and was Guest Editor of a special issue on the role of ABC pumps in drug transport (CTMC). Currently, he is developing potential PET radiotracers to visualize P-gp expression and function in tumor progression and in CNS. He is author of 100 papers and 8 patents following reported

disorders.

Papers

1994

1) Perrone, R.; Berardi, F.; Colabufo, N. A.; Tortorella, V.; Fiorentini, F.; Olgiati, V.; Vanotti, E.; Govoni, S. **Mixed 5-HT_{1A}/D-2 activity of a new model of arylpiperazines: 1-aryl-4-[3-(1,2-dihydronaphthalen-4-yl)-*n*-propyl]piperazines. 1. Synthesis and structure-activity relationships. *J. Med. Chem.* **1994**, *37*, 99-104.**

1995

2) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V.; Fiorentini, F.; Olgiati, V.; Ghiglieri, A.; Govoni, S. **High affinity and selectivity on 5-HT_{1A} receptor of 1-aryl-4-[(1-tetralin)alkyl]piperazines. 2. *J. Med. Chem.* **1995**, *38*, 942-949.**

3) Perrone, R.; Berardi, F.; Colabufo, N. A.; Tortorella V.; Lograno M. D.; Daniele, E.; Govoni, S. **Conformationally restricted thiazole derivatives a new class of 5-HT₃ receptor ligand.** *Farmaco*, **1995**, *50*, 77-82.

1996

4) Berardi, F.; Colabufo, N. A.; Giudice, G.; Perrone, R.; Tortorella, V.; Govoni, S.; Lucchi, L. **New σ and 5-HT_{1A} receptor ligands: ω -(tetralin-1-yl)-*n*-alkylamine derivatives.** *J. Med. Chem.* **1996**, *39*, 176-182.

5) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V.; Fornaretto M. G.; Caccia, C.; McArthur, R. **Structure-activity relationship studies on the 5-HT_{1A} receptor affinity of 1-phenyl-4-[ω -(α - or β - tetralinyl)alkyl]piperazines. 4.** *J. Med. Chem.* **1996**, *39*, 4928-4934.

1997

6) Perrone, R.; Berardi, F.; Colabufo, N. A. ; Leopoldo, M.; Lograno, M. D.; Tortorella, V. **4-[ω -Tetralin-1-yl]-1-benzylpiperazines and related compounds as 5-HT_{1A}/D-2 ligands.** *Med. Chem. Res.* **1997**, *7*, 76-86.

7) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **5-HT₃ and 5-HT₄ receptor affinities of naphtho[1,2-d]thiazole derivatives with various basic side chains.** *Med. Chem. Res.* **1997**, *7*, 519-529.

8) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **1-(2-Methoxyphenyl)-4-alkylpiperazines: effect of the N-4 substituent on the affinity and selectivity for dopamine D₄ receptor.** *Bioorg. Med. Chem. Lett.* **1997**, *7*, 1327-1330.

9) Perrone, R.; Berardi, F.; Colabufo, N. A.; Tortorella, V.; Fornaretto, M. G.; Caccia, C.; McArthur, R. A. **Synthesis of arylpiperazines with a terminal naphthothiazole group and their evaluation on 5-HT, DA and α receptors.** *Eur. J. Med. Chem.* **1997**, *32*, 739-746.

1998

10) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. ***N*-[2-[4-(4-Chlorophenyl)piperazin-1-yl]ethyl]-3-methoxybenzamide: a potent and selective dopamine D₄ ligand.** *J. Med. Chem.* **1998**, *41*, 4903-4909.

1999

11) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **1-Aryl-4-[N-(5-methoxy-1,2,3,4-tetrahydronaphthalen-1-yl)alkyl]piperazines and their analogues: influence of the stereochemistry of the tetrahydronaphthalen-1-yl nucleus on 5-HT_{1A} receptor affinity and selectivity versus α_1 and D₂ receptors.** *J. Med. Chem.* **1999**, *42*, 490-496.

12) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **2-(Aryloxy)ethylamine derivatives: ring opened congeners of long chain 1-arylpiperazines with high 5HT_{1A} receptor affinity and selectivity versus D₂ and α_1 receptors.** *Med. Chem. Res.* **1999**, *9*, 340-353.

2000

13) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **A structure-affinity relationship study on derivatives of *N*-[2-[4-(4-chlorophenyl)piperazin-1-yl]ethyl]-3-methoxybenzamide, a high-affinity and selective D₄ receptor ligand.** *J. Med. Chem.* **2000**, *43*, 270-277.

14) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Tortorella, V. **1-Substituted-4-[3-(1,2,3,4-tetrahydro-5- or 7-methoxynaphthalen-1-yl)propyl]piperazines: influence of the N-1 piperazine substituent on 5-HT_{1A} receptor affinity and selectivity versus D₂ and α_1 receptors. Part 6.** *Bioorg. Med. Chem.* **2000**, *8*, 873-881.

15) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Abate, C.; Tortorella, V. **N-Aryl-or N-alkylpiperazine derivatives: the role of N-substituent on σ_1 , σ_2 , 5-HT_{1A} and D₂ receptors affinity.** *Med. Chem. Res.* **2000**, *10*, 201-207.

2001

16) Berardi, F.; Ferorelli, S.; Colabufo, N. A.; Leopoldo, M.; Perrone, R.; Tortorella, V. **A multireceptorial binding reinvestigation on an extended class of σ ligands: N-[ω -(indan-1-yl and tetralin-1yl)alkyl]derivatives of 3,3-dimethylpiperidine reveal high affinities towards σ_1 and EBP sites.** *Bioorg. Med. Chem.* **2001**, *9*, 1325-1335.

17) Colabufo, N. A.; Berardi, F.; Calò, R.; Leopoldo, M.; Perrone, R.; Tortorella, V. **Determination of dopamine D₄ receptor density in rat striatum using PB12 as a probe.** *Eur. J.Pharmacol.* **2001**, *427*, 1-5.

18) Perrone, R.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Lacivita, E.; Tortorella, V.; Leonardi, A.; Poggesi, E.; Testa, R. **trans-4-[4-(Methoxyphenyl)cyclohexyl]-1-arylpiperazines: a new class of potent and selective 5-HT_{1A} receptor ligands as conformationally constrained analogues of 4-[3-(5-methoxy-1,2,3,4-tetrahydronaphthalen-1-yl)propyl]-1-arylpiperazines.** *J. Med. Chem.* **2001**, *44*, 4431-4442.

2002

19) Leopoldo, M.; Berardi, F.; Colabufo, N. A.; De Giorgio, P.; Lacivita, E.; Perrone, R.; Tortorella, V. **Structure-affinity relationship study on *N*-[4-(4-aryl)piperazin-1-yl]butyl]arylcaboxamides as potent and selective dopamine D₃ receptor ligands.** *J. Med. Chem.* **2002**, *45*, 5727-5735.

2003

20) Perrone, R.; Berardi, F.; Colabufo, N. A.; Lacivita, E.; Leopoldo, M.; Tortorella, V. **Synthesis and structure-affinity relationships of 1-[ω -(4-aryl-1-piperazinyl)alkyl]-1-aryl ketones as 5-HT₇ receptor ligand.** *J. Med. Chem.* **2003**, *46*, 646-649.

21) Berardi, F.; Loiodice, F.; Fracchiolla, G.; Colabufo, N. A.; Perrone, R.; Tortorella, V. **Synthesis of chiral 1-[ω -(4-chlorophenoxy)alkyl]-4-methylpiperidines and their biological evaluation at σ_1 , σ_1 and sterol Δ_8 - Δ_7 isomerase sites.** *J. Med. Chem.* **2003**, *46*, 2117-2124.

22) Colabufo, N. A.; Berardi, F.; Contino, M.; Perrone, R.; Tortorella, V. **A new method for evaluating σ_2 ligand activity in the isolated guinea-pig bladder.** *Naunyn Schmiedebergs Arch. Pharmacol.* **2003**, *368*, 106-112.

2004

23) Leopoldo, M.; Berardi, F.; Colabufo, N. A.; Contino, M.; Lacivita, E.; Perrone, R.; Tortorella, V. **Studies on 1-arylpiperazine derivatives with affinity for rat 5-HT₇ and 5-HT_{1A} receptors.** *J. Pharm. Pharmacol.* **2004**, *56*, 247-255.

24) Berardi, F.; Ferorelli, S.; Abate, C.; Colabufo, N. A.; Contino, M.; Perrone, R.; Tortorella, V. **4-(Tetralin-1-yl)- and (naphthalen-1-yl)alkyl derivatives of 1-cyclohexylpiperazine as sigma receptor ligands with agonist σ_2 activity.** *J. Med. Chem.* **2004**, *47*, 2308-2317.

25) Colabufo, N. A.; Berardi, F.; Contino, M.; Niso, M.; Abate, C.; Perrone, R.; Tortorella, V. **Antiproliferative and cytotoxic effects of some σ_2 agonists and σ_1 antagonists in tumour cell lines.** *Naunyn Schmiedebergs Arch. Pharmacol.* **2004**, *370*, 106-113.

26) Leopoldo, M.; Berardi, F.; Colabufo, N. A.; Contino, M.; Lacivita, E.; Niso, M.; Perrone, R.; Tortorella, V. **Structure-affinity relationship study on N-(1,2,3,4-tetrahydronaphthalen-1-yl)-4-aryl-1-piperazinealkylamides, a new class of 5-hydroxytryptamine₇ receptor agents.** *J. Med. Chem.* **2004**, *47*, 6616-6624.

2005

27) Perrone, R.; Berardi, F.; Colabufo, N. A.; Lacivita, E.; Larizza, C.; Leopoldo, M.; Tortorella, V. **Design and synthesis of long-chain arylpiperazines with mixed affinity for serotonin transporter (SERT) and 5-HT_{1A} receptor.** *J. Pharm. Pharmacol.* **2005**, *57*, 1319-1327.

28) Colabufo, N. A.; Berardi, F.; Contino, M.; Fazio, F.; Matarrese, M.; Moresco, R. M.; Niso, M.; Perrone, R.; Tortorella, V. **Distribution of sigma receptors in EMT-6**

cells: preliminary biological evaluation of PB167 and potentials for in vivo PET. *J. Pharm. Pharmacol.* **2005**, *57*, 1453-1459.

29) Turolla, E. A.; Matarrese, M.; Belloli, S.; Moresco, R. M.; Simonelli, P.; Todde, S.; Fazio, F.; Magni, F.; Kienle, M. G.; Leopoldo, M.; Berardi, F.; Colabufo, N. A.; Lacivita, E.; Perrone, R. **¹¹C-Labeling of *N*-[4-[4-(2,3-dichlorophenyl)piperazin-1-yl]butyl]arylcaboxamide derivatives and evaluation as potential radioligands for PET imaging of dopamine D₃ receptors.** *J. Med. Chem.* **2005**, *48*, 7018-7023.

30) Leopoldo, M.; Lacivita, E.; Colabufo, N. A.; Contino, M.; Berardi, F.; Perrone, R. **First structure-activity relationship study on dopamine D₃ receptor agents with *N*-[4-(4-aryl)piperazin-1-yl]butyl]arylcaboxamide structure.** *J. Med. Chem.* **2005**, *48*, 7919-7922.

31) Berardi, F.; Ferorelli S.; Abate, C.; Pedone, M. P.; Colabufo, N. A.; Contino, M.; Perrone, R. **Methyl substitution on the piperidine ring of *N*-[ω-(6-methoxynaphthalen-1-yl)alkyl] derivatives as a probe for selective binding and activity at the σ₁ receptor.** *J. Med. Chem.* **2005**, *48*, 8237-8244.

2006

32) Leopoldo, M.; Lacivita, E.; De Giorgio, P.; Colabufo, N. A.; Niso, M.; Berardi, F.; Perrone, R. **Design, synthesis, and binding affinities of potential Positron Emission Tomography (PET) ligands for visualization of brain dopamine D₃ Receptors.** *J. Med. Chem.* **2006**, *49*, 358-365.

33) Leopoldo, M.; Lacivita, E.; Colabufo, N. A.; Berardi, F.; Perrone, R. **Synthesis and binding profile of constrained analogues of *N*-[4-(4-aryl)piperazin-1-**

yl)butyl]-3-methoxybenzamides, a class of potent dopamine D₃ receptor ligands. *J. Pharm. Pharmacol.* **2006**, *58*, 209-218.

34) Colabufo, N. A.; Berardi, F.; Contino, M.; Ferorelli, S.; Niso, M.; Perrone, R.; Pagliarulo, A.; Saponaro, P.; Pagliarulo, V. **Correlation between sigma₂ receptor protein expression and histopathologic grade in human bladder cancer.** *Cancer Lett.* **2006**, *237*, 83-88.

35) Cassano G.; Gasparre, G.; Contino, M.; Niso, M.; Berardi, F.; Perrone, R.; Colabufo, N. A. **The sigma-2 receptor agonist PB28 inhibits calcium release from the endoplasmic reticulum of SK-N-SH neuroblastoma cells.** *Cell Calcium*, **2006**, *40*, 23-28.

36) Azzariti, A.; Colabufo, N. A.; Berardi, F.; Porcelli, L.; Niso, M.; Simone, G. M.; Perrone, R.; Paradiso, A. **Cyclohexylpiperazine derivative PB28, a σ_2 agonist and σ_1 antagonist receptor, inhibits cell growth, modulates P-glycoprotein and synergizes with anthracyclines in breast cancer.** *Mol. Cancer Ther.* **2006**, *5*, 1806-1816.

37) Colabufo, N. A.; Berardi, F.; Abate, C.; Contino, M.; Niso, M.; Perrone, R. **Is the σ_2 receptor a histone binding protein?** *J. Med. Chem.* **2006**, *49*, 4153-4158.

38) Colabufo, N. A.; Berardi, F.; Contino, M.; Niso, M.; Perrone, R.; Tortorella V. **The potent sigma receptor ligand PB167, as a potential PET radiotracer for evaluating the mammary sarcoma in mice.** *Arkivoc*, **2006**, *vii*, 95-101.

39) Lacivita, E.; Berardi, F.; Colabufo, N. A.; Leopoldo, M.; Perrone, R.; Tortorella V. **Synthesis and biological evaluation of potential positron emission**

tomography (PET) ligands for brain visualization of Dopamine D₃ receptors. *Arkivoc*, **2006**, *vii*, 102-110.

40) Colabufo, N. A.; Berardi, F.; Perrone, R.; Rapposelli, S.; Digiaco, M.; Balsamo, A. **Arylmethoxyphenyl derivatives: small molecules displaying P-glycoprotein inhibition.** *J. Med. Chem.* **2006**, *49*, 6607-6613.

2007

41) Leopoldo, M.; Lacivita, E.; Colabufo, N. A.; Niso, M.; Berardi, F.; Perrone, R. **Bivalent ligand approach on 4-[2-(3-methoxyphenyl)ethyl]-1-(2-methoxyphenyl)piperazine: Synthesis and binding affinities for 5-HT₇ and 5-HT_{1A} receptors.** *Bioorg. Med. Chem.* **2007**, *15*, 5316-5321.

42) Leopoldo, M.; Lacivita, E.; Contino, M.; Colabufo, N. A.; Berardi, F.; Perrone, R. **Structure-activity relationship study on N-(1,2,3,4-tetrahydronaphthalen-1-yl)-4-aryl-1-piperazinehexanamides, a class of 5-HT₇ receptor agents. 2.** *J. Med. Chem.* **2007**, *50*, 4214-4221.

43) Ferorelli, S.; Abate, C.; Colabufo, N. A.; Niso, M.; Inglese, C.; Berardi, F.; Perrone, R. **Design and evaluation of naphthol- and carbazole-containing fluorescent σ ligands as potential probes for receptor binding studies.** *J. Med. Chem.* **2007**, *50*, 4648-4655.

44) Leopoldo, M.; Lacivita, E.; Passafiume, E.; Contino, M.; Colabufo, N. A.; Berardi, F.; Perrone, R. **4-[ω -[4-Arylpiperazin-1-yl]phenyl]imidazo[1,2-a]pyridine derivatives: fluorescent high-affinity dopamine D₃ receptor ligands as potential probes for receptor visualization.** *J. Med. Chem.* **2007**, *50*, 5043-5047.

45) Colabufo, N. A.; Pagliarulo, V.; Berardi, F.; Contino, M.; Perrone, R.; Niso, M.; Albo, G.; de Rienzo, G.; Pagliarulo, A. **Human epididymal and prostatic tracts of vas deferens: different contraction response to noradrenaline stimulation in isolated organ bath assay.** *Eur. J. Pharmacol.* **2007**, *577*, 150-155.

2008

46) Colabufo, N. A.; Berardi, F.; Cantore, M.; Perrone, M. G.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R.; Azzariti, A.; Simone, G. M.; Porcelli, L.; Paradiso, A. **Small P-gp modulating molecules: SAR studies on tetrahydroisoquinoline derivatives.** *Bioorg. Med. Chem.* **2008**, *16*, 362-373.

47) Colabufo, N. A.; Perrone, M. G.; Contino, M.; Berardi, F.; Perrone, R. **Receptor-drug interaction: europium employment for studying the biochemical pathway of G-Protein-Coupled receptor activation.** *Metal-Based Drugs*, **2008**, *2007*, 1-8.

48) Colabufo, N. A.; Berardi, F.; Perrone, R.; Rapposelli, S.; Digiacomo, M.; Vanni, M.; Balsamo, A. **Synthesis and Biological Evaluation of (hetero)arylmethoxy- and arylmethylamine-phenyl derivatives as potent P-gp modulating agents.** *J. Med. Chem.* **2008**, *51*, 1415-1422.

49) Colabufo, N. A.; Abate, C.; Contino, M.; Inglese, C.; Ferorelli, S.; Berardi, F.; Perrone, R. **Tritium radiolabeling of PB28, a potent sigma-2 receptor ligand: pharmacokinetic and pharmacodynamic characterization.** *Bioorg. Med. Chem. Lett.* **2008**, *18*, 1484-1488.

50) Colabufo, N. A.; Abate, C.; Contino, M.; Inglese, C.; Niso, M., Berardi, F.; Perrone, R. **PB183, a sigma receptor ligand, as a potential PET probe for the imaging of prostate adenocarcinoma.** *Bioorg. Med. Chem. Lett.* **2008**, *18*, 1990-1993.

51) Perrone, M. G.; Santandrea, E.; Bleve, L.; Vitale, P.; Colabufo, N. A.; Jockers, R.; Milazzo, F. M.; Sciarroni, A.; Scilimati, A. **Stereospecific synthesis and bio-activity of novel β_3 -adrenoceptor agonist and inverse agonists.** *Bioorg. Med. Chem.* **2008**, *16*, 2473-2488.

52) Colabufo, N. A.; Berardi, F.; Cantore, M.; Perrone, M. G.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R.; Azzariti, A.; Simone, M. G.; Paradiso, A. **4-Biphenyl and 2-naphthyl substituted 6,7-dimethoxytetrahydroisoquinoline derivatives as potent P-gp modulators.** *Bioorg. Med. Chem.* **2008**, *16*, 3732-3743.

53) Colabufo, N. A.; Berardi, F.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R. **Effect of some P-glycoprotein modulators on Rhodamine-123 absorption in guinea-pig ileum.** *Bioorg. Med. Chem. Lett.* **2008**, *18*, 3741-3744.

54) Leopoldo, M.; Lacivita, E.; De Giorgio, P.; Fracasso, C.; Guzzetti, S.; Caccia, S.; Contino, M.; Colabufo, N. A.; Berardi, F.; Perrone, R. **Structural modifications of N-(1,2,3,4-tetrahydronaphthalen-1-yl)-4-aryl-1-piperazinehexanamides: influence on lipophilicity and 5-HT₇ receptor activity. Part III.** *J. Med. Chem.* **2008**, *51*, 5813-5822.

55) Colabufo, N. A.; Pagliarulo, V.; Berardi, F.; Contino, M.; Inglese, C.; Niso, M.; Ancona, P.; Albo, G.; Pagliarulo, A.; Perrone, R. **Bicalutamide failure in prostate cancer treatment: Involvement of Multi drug resistance proteins.** *Eur. J. Pharmacol.* **2008**, *601*, 38-42.

56) Berardi, F.; Abate, C.; Ferorelli, S.; de Robertis, A. F.; Leopoldo, M.; Colabufo, N. A.; Niso, M.; Perrone, R. **Novel 4-(4-aryl)cyclohexyl-1-(2-pyridyl)piperazines as Δ_8 - Δ_7 sterol isomerase (Emopamil Binding Protein) selective ligands with antiproliferative activity.** *J. Med. Chem.* **2008**, *51*, 7523-7531.

57) Colabufo, N. A.; Berardi, F.; Perrone, R.; Rapposelli, S.; Digiaco, M.; Vanni, M.; Balsamo, A. **2-[(3-Methoxyphenylethyl)phenoxy]-based ABCB1 inhibitors: effect of different basic side-chains on their biological properties.** *J. Med. Chem.* **2008**, *51*, 7602-7613.

58a) Colabufo, N. A.; Berardi, F.; Perrone, M. G.; Cantore, M.; Niso, M.; Perrone, R. **Small molecule and acridone derivatives as P-gp inhibitors.** Research Signpost, **2008**, pp 203-222; *capitolo 4c*. Editor Nicola Antonio Colabufo.

58b) Colabufo, N. A.; Berardi, Contino, M.; Inglese, C.; Perrone, R. **Flavonoids as MDR modulating agents: SAR studies.** Research Signpost, **2008**, pp 171-222; *capitolo 4b*. Editor Nicola Antonio Colabufo.

2009

59) Colabufo, N. A.; Berardi, F.; Perrone, M. G.; Cantore, M.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R. **Multi drug resistance reverting agents: 2-aryloxazole and 2-arylthiazole derivatives as potent BCRP or MRP1 inhibitors.** *ChemMedChem.* **2009**, *4*, 188-195.

60) Colabufo, N. A.; Berardi, F.; Contino, M.; Niso, M.; Perrone, R. **ABC pumps and their role in active drug transport.** *Curr. Top. Med. Chem.* **2009**, *9*, 119-129.

61) Cassano, G.; Gasparre, G.; Niso, M.; Contino, M.; Scalera, V.; Colabufo, N. A. **F281, synthetic agonist of the sigma-2 receptor, induces Ca²⁺ efflux from the endoplasmic reticulum and mitochondria in SK-N-SH cells.** *Cell Calcium* **2009**, *45*, 340-345.

62) Colabufo, N. A.; Saponaro, P.; Bottalico, M.; Contino, M.; Inglese, C.; Pagliarulo, V.; Pagliarulo, A.; Berardi, F.; Perrone, R. **Sigma-2 receptors as potential novel biomarkers during the progression of Benign Prostatic Hypertrophy (BPH) into prostate cancer.** *The Open Biomarkers Journal* **2009**, *2*, 11-13.

63) van Waarde A.; Ramakrishnan N. K.; Rybczynska, A. A.; Elsinga, P. H.; Berardi, F.; De Jong J. R.; Kwizera, C.; Perrone, R.; Cantore, M.; Sijbesma J. W. A.; Dierckx R. A.; Colabufo, N. A. **Synthesis and preclinical evaluation of novel PET probes for P-glycoprotein function and expression.** *J. Med. Chem.* **2009**, *52*, 4524-4532.

64) Colabufo, N. A.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R.; Roperto, S.; Roperto, F. **In vitro and ex vivo characterization of sigma-1 and sigma-2 receptors: agonists and antagonists in biological assays.** *Cent. Nerv. Syst. Agents Med. Chem.* **2009**, *9*, 161-171.

65) Berardi, F.; Abate, C.; Ferorelli, S.; Colabufo, N. A.; Perrone, R. **1-Cyclohexylpiperazine and 3,3-dimethylpiperidine derivatives as σ_1 and σ_2 receptor ligands: a review.** *Cent. Nerv. Syst. Agents Med. Chem.* **2009**, *9*, 205-219.

66) Berardi, F.; Abate, C.; Ferorelli, S.; Uricchio, V.; Colabufo, N. A.; Niso, M.; Perrone, R. **Exploring the importance of N-atoms for σ_2 receptor affinity and**

activity in a series of analogs of 1-cyclohexyl-4-[3-(5-methoxy-1,2,3,4-tetrahydronaphthalen-1-yl)propyl]piperazine (PB28). *J. Med. Chem.* **2009**, *52*, 7817-7828

2010

67) Roperto, S.; Colabufo, N. A.; Inglese, C.; Urraro, C.; Brun, R.; Mezza, E.; Staibano, S.; Raso, C.; Maiolino, P.; Russo, V.; Palma, E.; Roperto, F. **Sigma-2 receptor expression in bovine papillomavirus-associated urinary bladder tumours.** *J. Comp. Pathol.* **2010**, *142*, 19-26.

68) Azzariti, A.; Porcelli, L.; Simone, M. G.; Quatrone, A. E.; Colabufo, N. A.; Berardi, F.; Perrone, R.; Zucchetti, M.; D'Incalci, M.; Xu, J. M.; Paradiso, A. **Tyrosine kinase inhibitors and multidrug resistance proteins: interactions and biological consequences.** *Cancer Chemother. Pharmacol.* **2010**, *65*, 335-346.

69) Abate, C.; Elenewski, J.; Niso, M.; Berardi, F.; Colabufo, N. A.; Azzariti, A.; Perrone, R.; Glennon, R. A. **Interaction of the σ_2 receptor ligand PB28 with the human nucleosome: computational and experimental probes of interaction with the H2A/H2B dimer.** *ChemMedChem.* **2010**, *5*, 268-273.

70) Colabufo, N. A.; Berardi, F.; Cantore, M.; Contino, M.; Inglese, C.; Niso, M.; Perrone, R. **Perspective of P-glycoprotein modulating agents in oncology and neurodegenerative diseases: pharmaceutical, biological, and diagnostic potentials.** *J. Med. Chem.* **2010**, *53*, 1883-1897

71) Carocci, A.; Lentini, G.; Catalano, A.; Cavalluzzi, M. M.; Bruno, C.; Muraglia, M.; Colabufo, N. A.; Galeotti, N.; Corbo, F.; Matucci, R.; Ghelardini, C.; Franchini, C.

Chiral aryloxyalkylamines: selective 5-HT_{1B/1D} activation and analgesis activity. *ChemMedChem.* **2010**, *5*, 696-704.

72) Colabufo, N. A.; van Waarde, A. Preclinical evaluation of [¹¹C]MC18, a radiotracer for PET imaging of P-gp expression. *Curr. Top. Med. Chem.* **2010**, *10*, 383-384.

73) Bruyne, S. D.; Wyffels, L.; Moerman, L.; Sambre, J.; Colabufo, N. A.; Berardi, F.; Perrone, R.; De Vos F. Radiosynthesis and in vivo evaluation of [¹¹C]MC80 for P-glycoprotein imaging. *Bioorg. Med. Chem.* **2010**, *18*, 6489-6495.

74) Fruttero, R.; Crosetti, M.; Chegaev, K.; Guglielmo, S.; Gasco, A.; Berardi, F.; Niso, M.; Perrone, R.; Panaro, M. A.; Colabufo, N. A. Phenylsulfonylfuroxans as modulators of Multidrug-Resistance-associated Protein-1 and P-glycoprotein. *J. Med. Chem.* **2010**, *53*, 5467-5475.

75) Colabufo, N. A.; Berardi, F.; Perrone, M. G.; Capparelli, E.; Cantore, M.; Inglese, C.; Perrone, R. Substrates, inhibitor and activator of P-glycoprotein: candidates for radiolabeling and imaging perspectives. *Curr. Top. Med. Chem.* **2010**, *10*, 1703-1714.

76) Lacivita, E.; Masotti, A. C.; Jafurulla, M.; Saxena, R.; Rangaraj, N.; Chattopadhyay, A.; Colabufo, N. A.; Berardi, F.; Perrone, R.; Leopoldo, M. Identification of a red-emitting fluorescent ligand for in vitro visualization of human serotonin 5-HT_{1A} receptors. *Bioorg. Med. Chem. Lett.* **2010**, *20*, 6628-6632.

2011

77) Colabufo, N. A.; Contino, M.; Berardi, F.; Perrone, R.; Panaro, M. A.; Cianciulli, A.; Mitolo, V.; Azzariti, A.; Quatrane, A.; Paradiso A. **A new generation of MDR modulating agents with dual activity: P-gp inhibitor and iNOS inducer agents.** *Toxicol In Vitro*, **2011**, *25*, 222-230.

78) Abate, C.; Niso, M.; Contino, M.; Colabufo, N. A.; Ferorelli, S.; Perrone, R.; Berardi, F. **1-Cyclohexyl-4-(4-aryl-cyclohexyl)piperazines: mixed σ and human Δ_8 - Δ_7 sterol isomerase ligands with antiproliferative and P-glycoprotein inhibitory activity.** *ChemMedChem*. 2011, *6*, 73-80.

79) Colabufo, N. A.; Contino, M.; Niso, M.; Berardi, F.; Leopoldo, M.; Perrone, R. **EGFR tyrosine kinase inhibitors and multidrug resistance: perspectives.** *Front. Biosci.* **2011**, *16*, 1811-1823.

80) Marrazzo, A.; Cobos, E. J.; Parenti, C.; Aricò, G.; Marrazzo, G.; Ronsisvalle, S.; Pasquinucci, L.; Prezzavento, O.; Colabufo, N. A.; Contino, M.; González, L. G.; Scoto, G. M.; Ronsisvalle, G. **Novel potent and selective σ ligands: evaluation of their agonist and antagonist properties.** *J. Med. Chem.* **2011**, *54*, 3669-3673.

81) Abate, C.; Ferorelli, S.; Contino, M.; Marottoli, R.; Colabufo, N. A.; Perrone, R.; Berardi, F. **Arylamides hybrids of two high-affinity σ_2 receptor ligands as tools for the development of PET radiotracer.** *Eur. J. Med. Chem.* **2011**, *46*, 4733-4741.

82) Azzariti, A.; Quatrane, A. E.; Porcelli, L.; Colabufo, N. A.; Cantore, M.; Cassano, G.; Gasparre, G.; Iannelli, G.; Tommasi, S.; Panaro, M. A.; Paradiso, A. **MC70**

potentiates doxorubicin efficacy in colon and breast cancer in vitro treatment. *Eur. J. Pharmacol.* **2011**, *670*, 74-84.

83) Inglese, C.; Perrone, M. G.; Berardi, F.; Perrone, R.; Colabufo, N. A. **Modulation and absorption of xenobiotics: the synergistic role of CYP450 and P-gp activities in cancer and neurodegenerative disorders.** *Curr. Drug Metab.* **2011**, *8*, 702-712.

84) Cantore, M.; Capparelli, E.; Berardi, F.; Perrone, R.; Colabufo, N. A. **Clinical pharmacokinetic and metabolism of PET radiotracers for imaging P-glycoprotein in chemoresistant tumor of colorectal cancer.** *Curr. Drug Metab.* **2011**, *10*, 985-988.

85) Ferorelli S.; Abate, C.; Pedone M. P.; Colabufo, N. A.; Contino, M.; Perrone, R.; Berardi, F. **Synthesis and binding assays of novel 3,3-dimethylpiperidine derivatives with various lipophilicities as σ_1 receptor ligands.** *Bioorg. Med. Chem.* **2011**, *19*, 7612-7622.

2012

86) Pellicani, R. Z.; Stefanachi, A.; Niso, M.; Carotti, A.; Leonetti, F.; Nicolotti, O.; Perrone, R.; Berardi, F.; Cellamare, S.; Colabufo, N. A. **Potent galloyl-based selective modulators of Multidrug Resistance-Associated Protein 1 and P-glycoprotein.** *J. Med. Chem.* **2012**, *55*, 424-436.

87) Catalano A.; Desaphy, J. F.; Lentini, G.; Di Mola, A.; Bruno, C.; Carbonara, R.; De Palma, A.; Budriesi, R.; Ghelardini, C.; Perrone M. G.; Colabufo, N. A.; Conte Camerino, D.; Franchini, C. **Synthesis and Toxicopharmacological Evaluation of meta-Hydroxymexiletine, the First Metabolite of Mexiletine more Potent**

than the Parent Compound on Voltage-gated Sodium Channels. *J. Med. Chem.* **2012**, *55*, 1418-1422.

88) Contino, M.; Cantore, M.; Capparelli, E.; Perrone, M. G.; Niso, M.; Inglese, C.; Berardi, F.; Leopoldo, M.; Perrone, R.; Colabufo, N. A. **A benzopyrane derivative as a P-glycoprotein stimulator: a potential agent to decrease β -amyloid accumulation in Alzheimer's disease.** *ChemMedChem*, **2011**, *7*, 391-395.

89) Lacivita, E.; Patarnello, D.; Stroth, N.; Caroli, A.; Niso, M.; Contino, M.; De Giorgio, P.; Di Pilato, P.; Colabufo, N. A.; Berardi, F.; Perrone, R.; Svenningsson, P.; Hedlund, P.; Leopoldo, M. **Investigations on the 1-(2-biphenyl)piperazine motif. Identification of new potent and selective ligands for the serotonin7 (5-HT7) receptor with agonist or antagonist action in vitro or ex vivo.** *J. Med. Chem.* **2012**, *55*, 6375-6380.

90) Lacivita, E.; Di Pilato, P.; De Giorgio P.; Colabufo, N. A.; Berardi, F.; Perrone, R.; Leopoldo M. **The therapeutic potential of 5-HT1A receptors: a patent review.** *Expert Opin. Ther. Pat.* **2012**, *22*, 887-902.

91) Mairinger, S.; Wanek, T.; Kuntner, C.; Doenmez, Y.; Strommer, S.; Stanek, J.; Capparelli, E.; Chiba, P, Müller, M.; Colabufo, N. A.; Langer, O. **Synthesis and preclinical evaluation of the radiolabeled P-glycoprotein inhibitor [^{11}C]MC113.** *Nucl. Med. Biol.* **2012**, *39*,1219-1225.

92) Lacivita, E.; Leopoldo, M.; Berardi, F.; Colabufo, N. A.; Perrone, R. **Activatable fluorescent probes: a new concept in optical molecular imaging.** *Curr. Med. Chem.* **2012**, *19*, 4731-4741.

93) Contino, M.; Cantore, M.; Leopoldo, M.; Colabufo, N. A. **Biomarkers for the early diagnosis of Alzheimer's disease: the challenge of XXI century.** *Advances in Alzheimer's disease*. **Xxx**, xx, xx-xx.

94) Contino, M.; Carrieri, A.; Berardi F.; Leopoldo, M.; Perrone, R.; Thomas, R.; Colabufo, N. A. **Guinea-pig ileum as ex vivo model useful to characterize ligands displaying Imidazoline I2 and Adrenergic alpha2 mixed activity: a preliminary study.** *Drugs and Therapy Studies*, **xxxx**, xx-xxx-xxx.

95) Perrone, M. G.; Inglese, C.; Leopoldo, M.; Berardi, F.; Perrone R.; Colabufo, N. A. **Comparative evaluation of two dye probes in the rat everted gut sac model for unambiguous classification of P-gp substrate and inhibitor.** *Journal of Pharmacological and Toxicological Methods*

Patents

1) Leopoldo, M.; Lacivita, E.; Colabufo, N. A.; De Giorgio P.; Berardi, F.; Perrone R. (2011). 1-Arylpiperazinic ligands of 5-HT7 receptor and use thereof. PCT/EP2011/058419.

2) Colabufo, N. A.; Perrone, R.; Leopoldo, M.; Cantore, M.; Contino, M., Niso, M. (2011). Novel tetrahydroisoquinoline compounds for use in the diagnosis and treatment of neurodegenerative diseases. PCT/EP2011/058469.

3) Colabufo, N.A.; Perrone, R.; Berardi, F.; Perrone, M. G.; Inglese C.; Leopoldo, M. (2011). Method of screening for therapeutic compounds useful in detoxifying central nervous system from beta-amyloid. PCT/EP2011/058631.

4) Abate, C.; Berardi, F.; Colabufo, N. A.; Perrone, R. (2008). Tritium radiolabeling of [3H]-1-cyclohexyl-4-[3-(5-methoxy-1,2,3,4-tetrahydronaphthalen-1-yl)-n-propyl]piperazine ([3H]-PB28) as a potent sigma-2 receptor ligand. PCT/IB2008/050659.

- 5) Colabufo, N. A.; Berardi, F.; Perrone, R. (2007). Sigma-2 receptor, method of screening of specific ligands and use of the same in diagnostic or therapeutic methods. PCT IB2007/050029.
- 6) Berardi, F.; Colabufo, N. A.; Perrone, R.; Balsamo A.; Rapposelli, S. (2007). 1-Phenylalkoxy-2-beta-phenylethylderivatives as P-gp inhibitors useful in drug resistance events. USA 11/869,136.
- 7) Paradiso A.; Azzariti, A.; Berardi, F.; Colabufo, N. A.; Perrone, R. (2006). Verapamil analogues with inhibition activity on ABC (ATP Binding cassette) cell extrusion pumps. PCT/EP2007/057627.
- 8) Leopoldo, M.; Berardi, F.; Colabufo, N. A.; Contino, M.; Lacivita, E.; Niso, M.; Perrone, R.; Tortorella, V. (2005). N-(1,2,3,4-tetrahydronaphthalen-1-yl)-4-phenyl-1-piperazinealkylamide derivatives, and therapeutic use thereof as 5-HT₇ receptor ligands. USA 2007-0117811-A del 24/05/2007.