Béatrice L'Azou, PharmaD, PhD, HDR
Assistant Professor

Department : Biology Cellular
Collège Santé, UFR Pharmacie
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Research Interests:

I joined the University of Bordeaux in 1997 as asssitant professor in the department of Cell Biology in Pharmacy. My research had been focused on development of *in vitro* models, first in kidney (isolated structures and cell cultures) in order to better understand the cellular and molecular mechanisms induced by xenobiotics or environmental molecules. Since January 2014, I integrated Biotis U1026 Inserm team working on tissue bioengineering.

My research always focused on *in vitro* studies:

From 1991 to 1997, during my PhD, I worked on cellular mechanisms induced by immunosuppressive molecules as cyclosporinA, and by *in vitro* approach, I study the main factors that regulate renal hemodynamics to better understand nephrotoxicity. During my postdoctoral position, Sandoz Pharma Laboratories in Basel (CH) have developed innovative immunosuppressive drugs and I participated in the selection of numerous molecules with reduced renal toxicity.

From 1997 to 2013, my research focused on environment and public health, and particularly into the impact of heavy metals on the health of exposed populations (workers or general population). My objectives were to investigate *in vitro* cellular mechanisms induced by heavy metals, especially cadmium (Cd). In a multidisciplinary study, I also participated in ANR project on nanoparticles (NPs) for which toxicological data were still insufficient to confirm, or not, theirs toxicity At the nanoscale, the material acquires a specific behavior, exacerbating their physicochemical properties, but also their biological reactivity.

Nanoparticles of TiO_2, CdS and SiO_2, were studied on two human proximal tubular, normal or tumoral cell lines in order to study the influence of cellular physiological state on NPs induced toxicity. NPs cytotoxicity were dose-dependent with greater toxicity found on tumoral cell line showing a greater sensitivity of cancer cell line. From a mechanistic point of view, the involvement of oxidative stress was confirmed, and in response to NPs, cells produced anti-oxydant enzymes. Additionally, FT-IR spectroscopy (Fourier Transform InfraRed) used as complementary to conventional analytical methods allowed the detection of radical oxygen species and lipid peroxidation.

Since January 2014, in Inserm U1026 team Biotis, I focused my research on the field of vascular tissue engineering. Tissue engineering developped biological substitutes in order to restore or reconstruct tissue functions. One goal of the vascular group, was to develop a cellularized vascular substitute based hydrogel chitosan. In this area, the cellular component is very important. A healthy endothelial layer is crucial to creating the anti-thrombogenic surface required to interact with the circulating blood and to prevent the initiation and progression of the pathophysiological cascade. As exemple, endothelial NO (produced by endothelial NO synthase, eNOS) is physiologically important for maintaining vascular homeostasis. My interest was to analyze the biochemical pathways of NO synthesis and to estimate NO production, eNOS enzyme activity and/or eNOS gene expression by endothelial cells seeded on hydrogel chitosan.

Keywords/expertise:

Cell Culture	Kidney cells	Endothelial cells	PECs
Nephrotoxicity	Cytotoxicolgy	Oxidative Stress	Vasoreactivity
Nanotoxicity	Endocytosis	Heavy metal	Cadmium
Nanoparticles	Titanium oxide	Spectrometry	Microscopy
Image Analysis	Immunofluorescence	eNOS	Nitric oxide
Vascular substitute	Chitosan		

Selected Publications :

1- Barron E., Passagne I., Auger A., Travoa A., Rascol E., **L'Azou B**., Forfar I. Monitoring biological effect of 20 nm versus 100 nm silica nanoparticles induced on a human renal cell line using Fourier Transform Infrared spectroscopy. Anal. Methods, 2016, 8, 2233-2242.

2- Pujalté I., Passagne I., Daculsi R., De Portal C.,Ohayon-Courtès C., **L'Azou B.** Cytotoxic effects and cellular oxidative mechanisms of metallic nanoparticles on renal tubular cells: impact of particle solubility. Toxicology Research, 2015, 4, 409-422.

3- **L'Azou B**., Passagne I., Monicou S., Treguer M., Pujalté I., Szpunar J., Lobinski R., Ohayon-Courtès C. Comparative cytotoxicity of cadmium ($CdCl_2$, CdO, CdS micro and nanoparticles in renal cells. Toxicology Research, 2014, 3, 1, 32-41.

4- Passagne, I., Morille, M., Rousset, M., Pujalté, I., **L'Azou, B**. Implication of oxidative stress in size-dependent toxicity of silica nanoparticles in kidney cells. Toxicology 2012, 299 (2-3), 112-124

5- Pujalte I., Passagne I., Brouillaud B., Treguer M., Durand E., Ohayon-Courtes C., **L'Azou B**. Cytotoxicity and oxidative stress induced by different metallic nanoparticles on human kidney cells. Part Fibre Toxicol, 2011, 8, 10.

6- De Gabory L., Bareille R, Daculsi R., **L'Azou B**, Flahaut E., Bordenave L. Carbon nanotubes have a deleterious effect on the nose: the first in vitro data. Rhinology. 2011, 49, 4, 445-452

7- Mounicou S., Ouerdane L., **L'Azou B**., Passagne I., Ohayon Courtès C., Szpunar J., Lobinski R. Identification of metallothionein subisoforms in HPLC using accurate mass and online sequencing by electrospray hybrid linear ion trap-orbital ion trap mass spectrometry. Analytical Chemistry, 2010, 82, 6947-6957

8- Pédeboscq S., **L'Azou B**., Passagne I., De Giorgi F., Ichas F., Pometan J.P., Cambar J. Anticancer drugs exert differential apoptotic and cytotoxic effets on glioblastoma primary cultures with various EGFR and bcl-2 profiles. Journal of Experimental Therapeutics Oncology 2009, 8, (2): 105-116.

9- **L'Azou B**., Jorly J., On D., Sellier E., Moisan F., Fleury-Feith J., Cambar J., Brochard P., Ohayon C. In vitro effects of nanoparticles on renal cells. Particle and Fibre Toxicology 2008, Dec 19, 5 (1) :22.

10- Mireille Canal-Raffin M., **L'Azou B**., Jorly J., Hurtier A., Cambar J., Brochard P. Cytotoxicity of folpet fungicide on human bronchial epithelial cells. Toxicology 2008, 249, 160-166.

11- Pédeboscq S., **L'Azou B**., Passagne I., De Giorgi F., Ichas F., Pometan J.P., Cambar J. Cytotoxic and apoptotic effects of bortezomib and gefitinib compared to alkylating agents on human glioblastoma cells. Journal of Experimental Therapeutics and Oncology 2008, 7, 2, 99-111.

12- Canal-Raffin M., **L'Azou B**., Martinez B., Sellier E., Fawaz F., Robinson P., Ohayon-Courtès C., Baldi I., Cambar J., Molimard M., Moore N., Brochard P. Physicochemical characteristics and bronchial epithelial cell cytotoxicity of Folpan 80 WG® and Myco 500®, two commercial forms of folpet. Particle and Fibre Toxicology 2007, 4, 8, 1-13.

13- **L'Azou B**., Dubus I., Ohayon-Courtès C., Cambar J. Human glomerular mesangial IP15 cell line as suitable model for in vitro cadmium cytotoxicity studies. Cell Biology and Toxicology, 2007, 23, 4, 267-278.

14- Ohayon-Courtès C., Passagne I., De Portal C., Pouvreau C., Cambar J., **L'Azou B.** ICP/OES application for assessing cadmium uptake (or toxicity) in glomerular cells: influence of extracellular calcium. Journal of Toxicology and Environmental Health, Part A, 2007, 70, 750-759.

15- Pédeboscq S., **L'Azou B**., Liguoro D. , Pometan J.P., Cambar J. Interindividual differences in anticancer drug cytotoxicity in primary human glioblastoma cells. Experimental and Toxicologic Pathology, 2007, 58, 4, 247-253.

16- **L'Azou B**., Fernandez P., Bareille R., Beneteau M., Bourget C., Cambar J., Bordenave L. In vitro endothellial cells susceptibility to xenobiotics. Comparison of three cell types; Cell Biology and Toxicology, 2005, 21, (2), 127 – 137

17- Mourre C**., Lazou B.,** Cambar J., Neuilly G., Hugues M. Characterization of mapacalcine-sensitive Ca2+ channels in rat kidney. Biochemical and Biophysical Research Communications, 2003, 308, (3), 602-607.

18- Dubus I., **L'Azou B.,** Gordien M., Delmas Y., Labouyrie J.P., Bonnet J., Combe C. Cytoskeletal reorganization by mycophenolic acid alters mesangial migration and contractility. Hypertension, 2003, 42, (5), 956 - 961.

19- **L'Azou B.,** Dubus I., Ohayon-Courtès C., Labouyerie J.P., Perez L., Pouvreau C., Juvet L., Cambar J. Cadmium induces direct morphological changes in mesangial cell culture. Toxicology, 2002, 179, (3), 233-245.

20- **L'Azou B**., Hengé-Napoli MH., Minaro L., Mirto H., Barrouillet MP., Cambar J. Effects of cadmium and uranium on some in vitro renal targets. Cell Biology and Toxicology, 2002, 18, (5), 329-340.

Book / book Chapter

1- **L'Azou B,** Cambar J. Cultures de cellules rénales. *In :* Barlovatz-Meinon G, Ronot X. Cultures de cellules animales. *Edition INSERM 3ème* Lavoivier, Paris. 2014, 28, pp 448-475.

2- **L'Azou B**., Marano F. Nanoparticle Toxicity Mechanisms: Oxydative Stress and Inflammation. In: Houdy P., Lahmani M., Marano F. (Eds) Nanoethics and Nanotoxicology, Springer 2011, 4, p87-10

3- **L'Azou B.,** Marano F. « Mécanisme des nanoparticules : Inflammation et stress oxydant» Edition Belin, Nanosciences : Nanotoxicologie et Nanoéthique, 2010, Chapitre 4, p121-143

4- **L'Azou B**., Cambar J. Les cultures de cellules rénales en pharmacologie. In : Barlovatz-Meinon G, Adolphe M. Cultures de cellules animales. *Edition INSERM*. 2003, 24, pp 491-548.

5- Hengé-Napoli MH., **L'Azou B.**, Bérard P., Cambar J. Toxicité de l'Uranium. In L'Uranium de l'environnement à l'homme. *Eds EDP Sciences*. 2002. Pp 239-260.

Teaching Activities (> 192 h):

- ✓ PACES UE1: Atomes, Molécules et Génome (12h TD)(Medical, Pharmacy)
- ✓ PACES UE2: La cellule et les tissus (32h TD) (Medial, Pharmacy)
- ✓ 2° Pharmacie: Biologie Cellulaire (experimental training ,TP 81 h, TD 6h)
- ✓ 2° Pharmacie: Prévention Sécurité (CM, TD TP, 12h)
- ✓ 2° Pharmacie: UE Projet Professionel
- ✓ 2° Pharmacie Communication
- ✓ L3: SDV Culture Cell (TD 3h)
- ✓ L2 TECSAN: Experimental Training in Microscopie and Culture cellulaire (TP, 6h)
- ✓ 4° Pharmacie: EC Cancérologie. Cycle cellulaire (CM 3h)
- ✓ UE Recherche: IMPEC (CM, TD 21h), ACCEM (CM, TD 12h)
- ✓ Formation des Préparateurs en Pharmacie - Institut des Métiers de la Santé - (CM, 21h)
- ✓ Formation des Manipulateurs en Radiologie- Institut des Métiers de la Santé - (CM, 12h)

Funding:

2010-2012 : Coordinator project ANSES "*NanoADAPT" : (*48 841€).
2007-2010 : Coordinator project AFSSET - (104 975 €).
2009-2012 : Participation MEEDDM/INERIS *"NanoTRANS*" (40 000 €).
2006-2008 : Participation Projet ANR "*NANOTOX" ;* (45 000 €).
2007-2008 : Participation Projet AFSSET "Obexpro"(65 000 €).

Memberships:

EXON (Association des enseignants de Biologie cellulaire)
ANTIOPES, (CEA et INERIS) ANTIOPES enables joint research efforts and users of industrial chemistry to build tools and predictive models hazards of substances for humans and ecosystems

Administrative

Membre élu du Conseil d'Administration de l'Université CA (2005-2013)
Membre nommé/élu de la Commission Nationale Universitaire CNU 87 (2005-2015)
Membre élu du CA du Service commun de la Documentation (depuis 2009-2013)
Membre élu du Conseil de l'UFR de Pharmacie (depuis 2001)
Membre du Conseil Hygiène et Sécurité de l'Université (2005-2008)

Education:

2010	HDR	Université de Bordeaux
1997	Assistant Professor	Université de Bordeaux
1993-96	Post doctoral position	Sandoz Pharma, Basel, CH
1990-93	Ph.D. in Cell Biology	Université Bordeaux 2 - UFR Pharmacie
1989 – 90	Master in Toxicology	Université Paris 7 Paris
1982 – 89	Pharmacy	Université de Bordeaux 2