dothelial cells leads to dysfunction of vascular system which can contribute to cardiovascular diseases and complications of diabetes. Therefore, understanding what causes the defects of apoptosis in those disease-related cells will provide new insights in designing target-specific therapies to treat those diseases. In order to develop a method of real-time detection of apoptosis within the target cells, we genetically engineered a fluorescence resonance energy transfer (FRET)-based biosensor. When this biosensor is synthesized in the transfected cells, the sensor protein can detect caspase activation-mediated apoptosis by changing the color from green to blue. We have generated a bank of 32 sensor cell lines consisting of various types of cancer and non-cancerous cells. We also integrated these sensor cells into six model systems including a sensor cell-based high throughput drug screening assay, 3D *in vitro* tumor model, co-culture system, microfluidic system, zebrafish cancer model and xenograft tumor mouse models. In this talk, I will discuss the applications of these sensor cells and model systems in discovering new anticancer agents and elucidating the survival mechanisms of metastatic cancer cells in circulation.

Key words: anticancer agents; metastasis; apoptosis

Corresponding author: Kathy Qian LUO, E-mail: kluo@nut.edu.sg

Potential of anthocyanin-rich natural products to retard vascular aging: Role of endothelial senescence

Valérie SSCHINI-KERTH

(*UMR CNRS 7213*, *Strasbourg University*, *Strasbourg*, *France*)

Abstract: Numerous clinical studies have indicated that regular intake of polyphenol-rich products such as red wine and green tea is associated with a reduced risk of cardiovascular diseases. The protective effect has been attributable, in particular, to their high level of polyphenols such as flavanols and anthocyanins. The beneficial effect of polyphenols on the vascular system involves their ability to improve the lipid profile and to prevent platelet activation and inflammatory responses, and possibly also by a direct action at blood vessels. Indeed, grape-derived polyphenols and tea catechins are potent inducers of endothelium-dependent relaxations of isolated blood vessels by causing a sustained stimulation of the endothelial formation of nitric oxide (NO) and endothelium-derived hyperpolarization, two potent vasoprotective mechanisms. Besides grape-derived and tea products, several red and black fruit-derived products induce also potent vasoprotective effects. Intake of polyphenol-rich products has been shown to retard the induction of aging-related endothelial dysfunction and to improve an established aging-related endothelial dysfunction in rats. The beneficial effect is mostly due to the normalization of the high level of oxidative stress in the arterial wall and of the local angiotensin system. Moreover, polyphenol-rich products prevented the induction of replicative senescence at indicated by levels of senescence-associated beta-galactosidase activity and of key cell cycle regulators p53/p21 and p16 in cultured endothelial cells. The induction of endothelial senescence is associated with the down-regulation of endothelial NO synthase expression and the up-regulation of tissue factor expression most likely triggered by NADPH oxidase- and cyclooxygenase-derived oxidative stress, and leads to a reduced ability of endothelial cells to effectively inhibit platelet aggregation. Thus, regular intake of polyphenol-rich products can delay the induction of aging-related endothelial dysfunction most likely by preventing endothelial senescence, and as a consequence help to maintain an optimal protective effect of endothelial cells on the vascular system.

Key words: anthocyanin-rich; natural products; cardiovascular diseases

Corresponding author: Valérie SSCHINI-KERTH, E-mail: valerie.schini-kerth@unistra.fr