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## Low doses ionizing radiation and cardiovascular diseases

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### Abstract:

The relationship between high dose ionising radiation and cardiovascular diseases is well established. In contrast, after moderate doses (0,5-5Gy) the relationship is suggestive and weak after low doses (<0,5 Gy). However evidence is emerging after low-level exposure to ionizing radiation that the risk of diseases of the circulatory system could increase and is one of the most important matters currently facing radiological protection (Gillies et al, 2017). In the present framework recommended by the ICRP, no account is taken of any risk of CVD (e.g., heart disease and stroke) consequent to exposure to low doses or low dose-rates. Epidemiological studies, mainly occupational ones, suggest that the risk of CVD following low-level exposure is increased, but the results are not always consistent and causative associations cannot yet be made because of unresolved interpretational issues. Another difficulty for epidemiologists is the lack of data related to the biological mechanisms associated with the observed findings. A better understanding of the underlying biological and molecular mechanisms is needed.

Experimental studies on cardiovascular system indicate different responses based on the target, the dose and the dose-rate. The response of low doses on macrovascular or microvascular diseases is different based on cellular and molecular microenvironnement. For instance in the context of atherosclerosis, a chronic inflammatory disease, low doses modulate inflammatory profile and decreases the lesion sizes depending of the dose-rate in mice models (Mancuso et al, 2015; Legallic et al, 2015; Ebrahimian et al, 2017). Whereas in the context of ischemia low doses increase post-ischemic neovascularisation (Thanik at al, 2009; Heissig et al, 2002; Ministro et al, 2016). All of the current data suggests that all depends on the target and that more epidemiological and experimental research is required before final conclusions.