

Chronic kidney disease linked to malfunctioning mitochondria

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Chronic kidney disease (CKD) has been linked to oxidative stress caused by dysregulation of the genes that control mitochondria. A study in the open access journal *BMC Genomics* has revealed alterations in respiration gene expression in the white blood cells of CKD patients.

Gianluigi Zaza and Simona Granata, from the Renal Unit of University of Bari, Italy, led a team of researchers who carried out the genomic tests. Zaza said, "Our results suggest, for the first time, that CKD patients may have an impaired mitochondrial respiratory system and this condition may be both the consequence and the cause of enhanced oxidative stress".

The researchers found 44 genes that were up-regulated in the peripheral blood mononuclear cells of CKD patients, compared to normal controls. Of these, 11 were genes involved in the oxidative phosphorylation system. Further tests revealed that the levels reactive oxygen species (ROS) were significantly higher in the CKD group. Zaza and his colleagues suggest that these species are part of a vicious circle of respiration dysregulation that ultimately results in CKD, "Our hypothesis is that an increased production of ROS, due to the effect of pro-inflammatory mediators, may cause a profound inhibition of the oxidative phosphorylation system leading to a compensatory 'hypertrophy' of its components. In addition, a hypertrophic and impaired oxidative phosphorylation system may prime a vicious circle, causing a continuous release of ROS".

More information: Mitochondrial [dysregulation](#) and oxidative stress in patients with chronic kidney disease; Simona Granata, Gianluigi Zaza, Simona Simone, Gaetano Villani, Dominga Latorre, Paola Pontrelli, Massimo Carella, Francesco PAOLO Schena, Giuseppe Grandaliano and Giovanni Pertosa; [BMC Genomics](#) (in press); www.biomedcentral.com/bmcgenomics/

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