

## Association between Blood Levels of Selenium, Zinc and Copper and Survival in Colorectal Cancer Patients with Lynch Syndrome.

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**ABSTRACT:** Lynch syndrome (LS) is a hereditary predisposition to colon and other cancers that is caused by germline mutations in one of four mismatch repair (MMR) genes: *MLH1*, *MSH2*, *MSH6* or *PMS2*. The aim of this study was to evaluate the associations between blood levels of Selenium (Se), Zinc (Zn) and Copper (Cu) taken at or after diagnosis and survival in LS patients with colorectal cancer (CRC). Blood levels of Se, Zn and Cu were quantified in 59 CRC patients with a pathogenic variant in MMR genes. Patients were assigned to one of three tertiles for each element, according to the distribution in the entire cohort. Patients were followed for a mean of 5.0 years from diagnosis or blood taken (whichever is last), during which time 16 deaths were recorded. The age- and sex-adjusted hazard ratios (HR) for all-cause mortality in the middle tertile versus the bottom tertile were 0.28 (95% CI - 0.09-0.88;  $p = 0.03$ ) for Se. For Zn, the HR for all-cause mortality in the top and middle tertiles versus the bottom tertile were 0.05 (95% CI 0.01-0.42;  $p=0.006$ ) and 0.39 (95% CI 0.13-1.15;  $p = 0.08$ ) respectively. In contrast, elevated Cu levels were associated with relatively poor survival. The HR was 0.15 (95% CI 0.04-0.56;  $p = 0.005$ ) for those in the middle tertile compared to the top tertile. Higher blood levels of Se and Zn and lower blood levels of Cu have a beneficial effect on the survival of patients with CRC and LS.