

# **Copper and Zinc isotopic fractionation related to systemic inflammation following SARS-Cov-2 infection**

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It has been several years now that isotopic compositions of transition metals such as Cu and Zn have shown their potential as new pro-diagnostic markers [1-5]. These elements are known to have specific roles to insure the well-functioning of biological processes. If concentration of these elements can vary regards to the body condition, it can also vary between people due to different parameters such as the environment and lifestyle. On the other hand, isotope ratios are directly linked to specific biological and/or chemical processes. Fractionation of Cu and/or Zn isotopes can suggest a metabolic or immune [2] disturbance induced by some diseases such as neurodegenerative diseases [1,3] and cancer [4,6-7].

Since December 2019, humanity has encountered a new challenge due to the pandemic situation induced by the new SARS-Cov-2 virus, causing major failure of organs following systemic inflammation, sometimes without apparent relationship with the initial disease. Considering the short turnover of Cu and Zn in human body, we hypothesize that a dysregulation of these two different elements during severe COVID-19 should be rapidly observed, giving us the possibility to evaluate the potential of Cu and Zn isotopes as new pro-diagnostic tool during systemic inflammation. Here, we present preliminary data of <sup>65</sup>Cu and <sup>66</sup>Zn obtained on sera from both healthy people and Covid-19 patients using a chemistry protocol modified from [8]. We follow patients in Intensive Care Unit for 3 weeks until positive or negative issue, and we include patients who received experimental interferon treatment.

[1] Sauzéat et al. (2018), *iScience* 6, 264-271 [2] Albarède et al. (2017), *Reviews in Mineralogy & Geochemistry* 82, 851-885 [3] Moynier et al. (2017), *Geochemical Perspectives Lett.* 3, 142-150 [4] Balter et al. (2015), *PNAS* 112, 982-985 [5] Albarède et al. (2011), *Metallomics* 3, 926-933 [6] Toubhans et al. (2020), *Journal of Trace Elements in Medicine and Biology* 62, 126611 [7] Costas-Rodriguez et al. (2016) *Trends in Analytical Chemistry* 76, 182-193 [8] Maréchal et al. (1999) *Chemical Geology* 156, 251-273