

## Abstract

# The Effect of Cr(III) Supplementation in Combination with Diversified Zn Content in the Diet on the Cr Status in Wistar Rats <sup>†</sup>

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<sup>†</sup> Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

**Abstract:** Both Zn and Cr(III) independently show similar, beneficial effects on metabolic parameters, including carbohydrate and lipid metabolism particularly in patients with diabetes. However, the knowledge about the combined effect of Cr(III) supplementation in Zn homeostasis disorders is insufficient. The aim of the study was to investigate the effect of chromium(III) supplementation in combination with diversified Zn content in the diet on the tissual Cr levels in healthy Wistar rats (male and female). The model studies were carried out on 72 (36♀ + 36♂) Wistar rats, which were divided into 12 groups (6 animals separately for each sex) and then fed ad libitum with 6 test diets for 6 weeks. The control groups (C) were fed a semi-synthetic AIN-93 diet with recommended levels of Zn (35 mg/kg) and Cr(III) (1 mg/kg) for rodents. The other groups were fed AIN-93 diets modified for Zn(II) content (D-Zn deficiency-5% RDA, OS-Zn oversupply-500% RDA). At the same time, the diets were supplemented with Cr(III) at doses of 1 and 50 mg/kg. The sources of Zn and Cr(III) were Zn(II) carbonate and Cr(III) propionate (Cr3), respectively. The tissular chromium levels were measured with the GF-AAS method. It was found that the Cr(III) supplementation as well as the varied Zn supply independently and in combination affected the hepatic and renal Cr contents in rats. Independently, Cr(III) supplementation increased the Cr levels in the liver and kidneys in both sexes. However, with the increase of the Zn supply in the diet decreased the renal Cr content in male (significantly) and female (insignificantly) rats. Both Zn deficiency and oversupply increased the Cr saturation in the liver in both sexes. A significant combined effect of the factors on the liver and kidney Cr content only in male rats was observed. The simultaneous Cr(III) supplementation significantly increased the liver Cr content with the recommended (by 68%) and excess (153%), but not deficient Zn supply in the diet. The research proved that the diversified Zn content in the diet, individually and in combination with Cr(III) supplementation affected the Cr status in healthy rats.

**Keywords:** chromium(III); zinc; deficiency; supplementation; rats



**Citation:** Staniek, H.; Król, E.; Krejpcio, Z. The Effect of Cr(III) Supplementation in Combination with Diversified Zn Content in the Diet on the Cr Status in Wistar Rats. *Proceedings* **2023**, *91*, 182.

<https://doi.org/10.3390/proceedings2023091182>

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 2 February 2024



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**Author Contributions:** Conceptualization, H.S.; methodology, H.S., E.K. and Z.K.; validation, H.S.; formal analysis, H.S.; investigation, H.S. and E.K.; data curation, H.S.; writing—original draft preparation, H.S.; writing—review and editing, H.S.; visualization, H.S.; supervision, H.S. and Z.K.; project administration, H.S.; funding acquisition, H.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work was funded by the Polish National Science Centre under research project no. 2020/04/X/NZ9/00101.

**Institutional Review Board Statement:** The animal study protocol was approved by the Local Ethical Committee in Poznań (no. 48/2018, 28 December 2018).

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Data presented in this study are available from the corresponding author upon request.

**Conflicts of Interest:** The authors declare no conflict of interest.

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