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综述

铜伴侣蛋白CCS介导铜锌-超氧化物歧化酶激活的过程

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Activation Process of Copper/Zinc Superoxide Dismutase Mediated by CCS

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- 摘要
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文章导读 null

摘要 CCS是细胞质中铜锌-超氧化物歧化酶（SOD1）的铜伴侣蛋白。本文综述了CCS介导SOD1激活的过程。CCS与SOD1通过蛋白-蛋白相互作用的方式将铜离子插入到不含铜离子的SOD1（apoSOD1）中，并促进二硫键的形成而激活SOD1。影响CCS活性的因素包括：X连锁的细胞凋亡抑制蛋白（XIAP）、神经接头蛋白X11α和铜代谢中含结构域Murr1蛋白（COMMD1）。

关键词： CCS 铜 SOD1

Abstract： CCS is the copper chaperone for copper/zinc-superoxide dismutase 1 (SOD1) in cytoplasm. This review described the activation process of cytosolic SOD1 mediated by CCS. With the protein-protein interaction of CCS and SOD1, CCS can directly insert the copper ion into apoSOD1 and promote the formation of intramolecular disulfide bond in SOD1, then finish the activation of SOD1. The activity of CCS can be affected by X-linked inhibitor of apoptosis protein (XIAP), neuronal adaptor protein X11α and copper metabolism (Murr1) domain containing 1 (COMMD1). ［Chinese Journal of Animal Nutrition, 2011, 23（8）：1259 -1263］

Keywords： CCS, copper, SOD1

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[1] KIM B E, TRACY N, THIELE D J, et al. Mechanisms for copper acquisition, distribution and regulation[J]. Nature Chemical Biology, 2008, 4 (3):176-185.

[2] VALENTINE S J, GRALLA E B. Delivering copper inside yeast and human cells[J]. Science, 1997, 278(5339):817-818.

[3] KLOMP L W, LIN S J, YUAN D, et al. Identification and functional expression of HAH1, a novel human gene involved in copper homeostasis[J]. The Journal of Biological Chemistry, 1997, 272(14):9221-9226.

[4] GLERUM D M, SHTANKO A, TZAGOLOFF A. Characterization of COX17, a yeast gene involved in copper metabolism and assembly of cytochrome oxidase[J]. The Journal of Biological Chemistry, 1996, 271(24):14504-14509.

[5] CULOTTA V C, KLOMP L W. The copper chaperone for superoxide dismutase[J]. The Journal of Biological Chemistry, 1997, 272(38):23469-23472.

[6] CASARENO R L, DARREL W, GITLIN J D, et al. The copper chaperone CCS directly interacts with copper/zinc superoxide dismutase[J]. The Journal of Biological Chemistry, 1998, 273(37):23625-23628.

[7] SCHMIDT P J, RAE T D, PUFAHL R A, et al. Multiple protein domains contribute to the action of the copper chaperone for superoxide dismutase [J]. The Journal of Biological Chemistry, 1999, 274(34):23719-23725.

[8] SCHMIDT P J, KUNST C, CCLOTTA V C, et al. Copper activation of superoxide dismutase 1 (SOD1) in vivo[J]. The Journal of Biological Chemistry, 2000, 275(43):33771-33776.

[9] BROWN N M, TORRES A S, DOAN P E, et al. Oxygen and the copper chaperone CCS regulate posttranslational activation of Cu,Zn superoxide dismutase[J]. Proceedings of the National Academy of Sciences, 2004, 101(15):5518-5523.

[10] FURUKAWA Y, TORRES A S, OHALLORAN T V, et al. Oxygen-induced maturation of SOD1: a key role for disulfide formation by the copper chaperone CCS[J]. The EMBO Journal, 2004, 23(14):2872-2881.

[11] BRADY G F, GALBAN S, LIU X W , et al. Regulation of the copper chaperone CCS by XIAP-mediated ubiquitination[J]. Molecular and Cellular Biology, 2010, 30(8):1923-1936.

[12] FALCONI M, IOVINO M, DESIDERI A, et al. A model for the incorporation of metal from the copper chaperone CCS into Cu,Zn superoxide dismutase[J]. Structure, 1999, 7(8):903-908.

[13] LAMB A L, TORRES A S, O'HALLORAN T V, et al. Heterodimeric structure of superoxide dismutase in complex with its metallochaperone[J]. Nature, 2001, 8(9):751-755.

[14] FURUKAWA Y, THOMASV O. Posttranslational modifications in Cu,Zn-superoxide dismutase and mutations associated with amyotrophic lateral sclerosis[J]. Antioxidants & Redox Signaling, 2006, 8(5):847-867.

[15] BARTNIKAS T B, GITLIN J D. Mechanisms of biosynthesis of mammalian copper/zinc superoxide dismutase[J]. The Journal of Biological Chemistry, 2003, 278(35):33602-33608

[16] RAE T D, SCHMIDT P J, PUFAHL R A, et al. Undetectable intracellular free copper: the requirement of a copper chaperone for superoxide dismutase[J]. Science, 1999, 284(805):805-808.

[17] AMY L C, BARTNIKAS T B, GITLIN J D, et al. Mechanisms of the copper-dependent turnover of the copper chaperone for superoxide dismutase [J]. The Journal of Biological Chemistry, 2006, 281(19):13581-13587.

[18] BANCI L, BERTINI I, BAFFONI S C, et al. Affinity gradients drive copper to cellular destinations[J]. Nature, 2010, 10(465):1-4.

[19] ENDO T, FUJII T, SATO K, et al. A pivotal role of Zn-binding residues in the function of the copper chaperone for SOD1[J]. Biochemical and Biophysical Research Communications, 2000, 276(3):999-1004.

[20] HWANGA I K, EUMB W S, YOO K Y, et al. Copper chaperone for Cu,Zn-SOD supplement potentiates the Cu,Zn-SOD function of neuroprotective effects against ischemic neuronal damage in the gerbil hippocampus[J]. Free Radical Biology & Medicine, 2005, 39(3):392-402.

[21] TORRES A S, PETRI V, RAE T D, et al. Copper stabilizes a heterodimer of the yCCS metallochaperone and its target superoxide dismutase[J]. The Journal of Biological Chemistry, 2001, 276(42):38410-38416.

[22] KACHUR A V, KOCH C J, BIAGLOW J E. Mechanism of copper-catalyzed autoxidation of cysteine[J]. Free Radical Research, 1999, 31(1):23-34.

[23] BERTINATO J, LABBE M R. Copper modulates the degradation of copper chaperone for Cu,Zn superoxide dismutase by the 26 S proteosome[J]. The Journal of Biological Chemistry, 2003, 278(37):35071-35078.

[24] MCLOUGHLIN D M, STANDEN C L, LAU K F, et al. The neuronal adaptor protein X11α interacts with the copper chaperone for SOD1 and regulates SOD1 activity[J]. The Journal of Biological Chemistry, 2001, 276(12):9303-9307.

[25] WILLIANNE I M, WIJMENGA C, BERGER R, et al. Cu,Zn superoxide dismutase maturation and activity are regulated by COMMD1[J]. The Journal of Biological Chemistry, 2010, 285(37):28991-29000.

[1] 王兰梅1,2，王嘉1，薛敏1*，赵维香3，郑银桦1,3，王秋.**铜和维生素C交互作用对花鲈生长性能、肝脏铜积累量、免疫功能的影响**[J]. 动物营养学报, 2011,23(03): 395-402

[2] 张彩英，胡国良*，曹华斌，郭小权.**饲粮铜添加水平对育成蛋鸡免疫功能和抗氧化酶活性的影响**[J]. 动物营养学报, 2011,23(01): 154-161

[3] 鲍坤，李光玉*，崔学哲，王凯英，刘佰阳，刘晗璐.**不同形式铜对雄性梅花鹿血清生化指标及营养物质消化率的影响（英文） 点击此处查看中文全文**[J]. 动物营养学报, 2010,22(03): 717-722

[4] 向枭，李代金，周兴华，陈建，郑宗林.**铜鱼对4种饲料原料的离体酶解动力学研究**[J]. 动物营养学报, 2010,22(02): 335-340

[5] 曹华斌1,2，郭剑英2，苏荣胜2，潘家强2，李英2，唐兆.**日粮铜来源及水平对肉鸡肝损伤的影响**[J]. 动物营养学报, 2010,22(01): 39-45

[6] 梅绍锋1，余冰1,2，鞠翠芳1，祝丹1，陈代文1,2*.**高锌和高铜对断奶仔猪生产性能、消化生理和盲肠微生物数量的影响**[J]. 动物营养学报, 2009,21(06): 903-909

[7] 马德磊，李福昌*.**日粮铜水平对断奶至2月龄生长肉兔生产性能及血清指标的影响**[J]. 动物营养学报, 2009,21(04): 493-498

[8] 王 锋1，王 博2，3， 张春善日粮铜和维生素A及其互作效应对肉仔鸡生长性能和血液生理指标的影响[J]. 动物营养学报, 2009,21(02): 152-159

[9] 刘强 王聪 董宽虎 张延利&nb.**富铜酵母对西门塔尔牛阉牛瘤胃发酵及尿嘌呤衍生物的影响**[J]. 动物营养学报, 2008,20(03): 318-322

[10] 邢芳芳1,3 印遇龙1* 燕富永1 张宇喆1 刘志强1,3 .**饲料铜来源和水平对仔猪血清学指标及生长性能的影响**[J]. 动物营养学报, 2007,19(06): 647-653

[11] 吕爱军1 穆阿丽2 杨在宾小尾寒羊铜的营养盈缺状况研究[J]. 动物营养学报, 2007,19(05): 539-543

[12] 李淑青1,曹顶国2,杨在宾3.**日粮中不同钼铜水平对肉牛血液生化指标的影响**[J]. 动物营养学报, 2007,19(04): 17-22

[13] 杨 光 彭 西 邓俊良 崔恒敏.**铜中毒对雏鸡红细胞免疫功能的影响**[J]. 动物营养学报, 2006,18(04): 233-235

[14] 吕爱军; 杨在宾; 杨维仁; 姜淑贞; 张桂国; 展振锋;.**不同铜钼水平对小尾寒羊血清铜蓝蛋白和血浆过氧化物歧化酶活性的影响**[J]. 动物营养学报, 2005,17(01): 61-64

[15] 唐玲,冯琳,刘扬,胡凯,周小秋.**铜伴侣蛋白CCS介导铜锌-超氧化物歧化酶激活的过程**[J]. 动物营养学报, 0,(): 1259-1263