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ABSTRACT BOOK

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CREVNA MIKROBIOTA KAO OSETLJIVA META DELOVANJA TOKSIČNIH SUPSTANCI

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Crevna mikrobiota ima važnu ulogu u održavanju homeostaze koju ostvaruje preko interakcija sa imunskim sistemom i gastrointestinalnim traktom. Toksične supstance ostvaruju direktan štetni efekat na sastav i funkcionalnost crevne mikrobiote. Kadmijum (Cd) je metal sa izraženom toksičnošću, koji se povezuje sa brojnim oboljenjima. U našoj studiji je predložen mehanizam zaštite koji bi se ostvario posredstvom bakterijskih egzopolisaharida (EPS) izolovanih iz soja Lactiplantibacillus plantarum BGAN8, a bazira se na visokom afinitetu adsorpcije kadmijumovih jona. Ciljevi rada su bili utvrđivanje efekata produženog delovanja kadmijuma na sastav crevne mikrobiote Dark agouti (DA) pacova, kao i izučavanje efekta EPS-AN8 na ublažavanje takvih štetnih efekata.

Pacovi su kroz vodu unosili nižu (5 ppm) i višu (50 ppm) dozu kadmijuma, dok je EPS-AN8 (100 μg/ml) dat kroz hranu za životinje. Totalna DNK je izolovana iz lumena duodenuma i 16S rDNK amplikon je sekvenciran strategijom uparenih krajeva na Illumina NovaSeq platformi. Dodatno, praćene su promene u inflamaciji i oksidativnom stresu homogenata duodenuma. Kadmijum je favorizovao rast oportunističkih patogenih bakterija poput pripadnika rodova Blautia, Prevotella, Alloprevotela, Bacteroides, dok je relativna zastupljenost laktobacila bila značajno smanjena. Obe doze kadmijuma su stimulisale produkciju proinflamatornih citokina (IL-1β, TNF-α i IFN-γ) i povisile nivo oksidativnog stresa (MDA, CAT i GST). Oralni unos EPS-AN8 je značajno ublažio sve navedene promene. Oralna izloženost kadmijumu uzrokuje nedvosmislene promene u sastavu mikrobiote, koje mogu biti praćene i pojačanim nivoima inflamacije i oksidativnog stresa. Nasuprot tome, istovremeni unos EPS-AN8 redukuje pojavu takvih promena.

KLJUČNE REČI: kadmijum, crevna mikrobiota, egzopolisaharidi

GUT MICROBIOTA AS A TARGET OF TOXIC COMPOUNDS

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The gut microbiota has important role in maintaining homeostasis via its effect on the immune system and healthy gastrointestinal tract. Environmental toxicants directly influenced the changes in gut microbiota composition. Cadmium (Cd) is a hazard, world widely distributed metal. We have proposed the putative mechanism of protection against Cd harmful effect in the organism by using exopolysaccharides derived from Lactiplantibacillus plantarum BGAN8 (EPS-AN8) which has great ability to sequester Cd ions. Aims of our study were to examine Cd related changes in the gut microbiota of Dark agouti (DA) rats after prolonged oral exposure (30 days) to this metal and to determine impact of EPS-AN8 in preventing those changes.

Rats were given via water lower (5 ppm) and higher (50 ppm) Cd's dose. In paralel, EPS-AN8 was administrated through food (100 μg/ml). Total DNA from duodenum was isolated and PCR amplicon for 16SrRNA was sequenced on Illumina NovaSeq paired end platform. Moreover, we have followed changes in oxidative stress and inflammation in duodenum. Cd favored growth of opportunistic pathogen bacteria genera (Blautia, Prevotella, Alloprevotela, Bacteroides) while the relative abundance of lactobacilli was decreased. The both doses of Cd increased production of inflammatory cytokines (IL-1β, TNF-α, and IFN-γ). Also, parameters of oxidative stress were significantly upregulated (MDA, CAT, and GST). All the mentioned changes were alleviated by EPS-AN8. Oral exposure to Cd lead to inevitable changes in the microbiota structure followed by inflammation and oxidative stress of surrounding tissue, while administration of EPS-AN8 reversed those changes.

KEYWORDS: cadmium, gut microbiota, exopolysaccharides