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2ND

SCIENCE & BUSINESS SYMPOSIUM

PREBIOTIC LACTULOSE AS EFFICACIOUS MICROBIOTA AND METABOLITE MODULATOR IN CIRRHOSIS ENVIRONMENT

Andrea Mancini ⁽¹⁾ - Stefano Larsen ⁽²⁾ - Francesca Campagna ⁽³⁾ - Pietro Franceschi ⁽²⁾ - Piero Amodio ⁽³⁾ - Cecilia Pravadelli ⁽⁴⁾ - Massimo Pindo ⁽⁵⁾ - Kieran Tuohy ⁽¹⁾

Fondazione Edmund Mach, Food Quality and Nutrition, San Michele all'Adige, Italy ⁽¹⁾ - Fondazione Edmund Mach, Computational Biology Unit, San Michele all'Adige, Italy ⁽²⁾ - University of Padova, Department of Medicine-DIMED, Padova, Italy ⁽³⁾ - Santa Chiara Hospital, Gastroenterology Unit, Trento, Italy ⁽⁴⁾ - Fondazione Edmund Mach, Computational biology unit, San Michele all'Adige, Italy ⁽⁵⁾

Objective:

Gut microbiota has a fundamental role in the pathogenesis of liver cirrhosis as well as their complications as in the case of hepatic encephalopathy (HE). Current HE clinical treatment is mainly based on manipulating the gut microbiota and ammonia production/absorption using prebiotic lactulose, antibiotic rifaximin and probiotic VSL#3.

Methods:

Here we investigated the modulation of gut microbiota, in terms of microbial composition and metabolism, upon fermentation of lactulose, rifaximin and VSL#3, using in vitro-24hours anaerobic pH-controlled batch cultures inoculated with faecal microbiota of cirrhotic patients.

Results:

Over time, cirrhotic microbiota responded dynamically to the treatments. In particular, significant differences (PERMANOVA Weighted/Unweighted/Bray-Curtis estimators) were observed after 24h. The main taxa associated with decompensated cirrhosis, were reduced with lactulose. At the same time, taxa associated with healthy conditions, such as Lachnospiraceae, Ruminococcaceae, *Blautia* and *Bifidobacterium*, were promoted as confirmed by the Indicator Species Analysis. Lactulose alone or in combination with the probiotic VSL#3 led to an increase production of SCFA and decrease in ammonia production. These shifts in metabolite production are indicative of carbohydrate fermentation and are consistent with improved gut health and reduced risk of HE.

Conclusions:

We demonstrated that lactulose is able to significantly increase the relative abundance and absolute numbers of bifidobacteria, which was associated with an increased production of SCFA and a reduction in ammonia content. Future investigations should assess the molecular pathways that are involved in the modulation of gut microbiota and its metabolic reprogramming while translational studies should examine the clinical potential of this *in vitro* observations.

BIOCHEMICAL AND ANTIBIOTIC INFLUENCE OF GASTROINTESTINAL TRACTS MICROFLORA IN NEONATAL

Awatif Al-Judaibi ⁽¹⁾ - Effat AlJudaibi ⁽²⁾ - Sahar AlShareef ⁽²⁾

Jeddah University, Biological Science, Microbiology Section, Jeddah, Saudi Arabia ⁽¹⁾ - Jeddah University, Biological Science, Jeddah, Saudi Arabia ⁽²⁾

Objective:

Colonisation of the neonatal intestinal tract by microbiota may occur as early as the foetal stage, and this colonisation preforms the intestinal microbiota, which is reflected in the intestinal activity and neonate vitality. This study aimed to isolate and identify common bacteria in 19 preterm neonates spending their first weeks of life in the neonatal intensive care unit.

Methods:

First, stool samples were collected, and bacteria were isolated and purified from those samples.

Common bacterial species were investigated regarding their susceptibility or resistance to antibiotics. From 19 stool samples, 15 contained three species in common: *Enterobacter cloacae*, *Enterococcus faecalis* and *Klebsiella pneumoniae*.

Results:

Differences in the microbial formation and density were correlated with the type of delivery and feeding as well as the administration or no administration of antibiotics to the preterm neonate. Antibiotic susceptibility testing was undertaken, and minimum inhibitory concentrations were determined. The results showed that the minimum level of isolates was affected by several of the most commonly used antibiotics from the following families: aminoglycosides, carbapenems, fluoroquinolones, glycolcyclines and polymyxins.

Conclusions:

In the present study, we identified the most common bacterial species present in the intestinal microflora of premature infants during their first days after birth. *Enterobacter cloacae* and *Klebsiella pneumoniae* were the most common gram-negative bacteria, while *Enterococcus faecalis* was the most prevalent gram-positive bacterium. Our microbial susceptibility testing showed that these isolates were sensitive to several of the most commonly used antibiotics from the following families: aminoglycosides, carbapenems, fluoroquinolones, glycolcyclines and polymyxins. The analysis revealed a significant level of sensitive towards most tested antibiotics among certain strains isolated from neonates, which raises concern.