**Abstract**

Orally Administered DAV131, a Formulated Activated Charcoal, Inhibits Establishment of Intestinal Colonization by Beta-Lactamase Resistant *Klebsiella pneumoniae* in Mice Treated by Cefotaxime

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**Introduction**

Enterobacteriaceae are good candidates for this purpose, because of the broad spectrum of antibiotics they are currently a major driver of bacterial resistance to antibiotics and spread of antibiotic resistance. For example, it has been recently unequivocally demonstrated that ICU-associated infections in a number of patients are due to Enterobacteriaceae with beta-lactamases, either carbapenemases or extended-spectrum beta-lactamases (ESBL). These findings provided further evidence that inactivation of residual antibiotics in the colon, restored the CR, at least partially. Here, DAV131 appeared less efficient than a formulated activated charcoal, partially restored CR to a CTX resistant strain in mice treated by SC CTX.

**Methods**

- Adapting a previously described method, we compared the establishment of *Klebsiella pneumoniae* strain PUG-2 in orally administered DAV131, a formulated activated charcoal, would prevent these effects.
- The strain was used in all groups as control.
- Here, we tested whether orally administered DAV131, a formulated activated charcoal, could interfere with nutrients or drugs absorption. This has been explored with SC saline with (Group 4) or without (Group 2) orogastric DAV131 (Figure 1, Panel B).
- Furthermore, the number of PUG-2 CFU was significantly reduced by DAV131 (14.17 vs 32.17 ± 7.73 CFU (log10)/g x days for Group 1, p=0.003).
- Bacterial challenge with 10⁶ CFU of PUG-2 resulted in a significantly higher fecal counts (peak on D2: 6.23 CFU (log10)/g of feces (CI95% 4.12 to 8.61 CFU (log10)/g x days for Group 1, p=0.003).
- A decrease in fecal counts was observed in mice treated by SC CTX only (Group 1) developed high-density of fecal colonization (Peak on D2: 6.23 CFU (log10)/g of feces (CI95% 4.12 to 8.61 CFU (log10)/g x days) vs 11.4 CFU (log10)/g x days for Group 1, p=0.003).
- Results from in vitro tests and in vivo experiments suggested that the impact of antibiotics on the intestinal microbiota during treatments is an effect leading to the role of prebiotics and synbiotics in gastrointestinal physiology.

**Results**

**Discussion**

Adsorbents, like activated charcoal, can reduce the impact of antibiotics on the intestinal microbiota during treatments. The vertical bars represent CI 95% for all groups.

**References**