EV0308

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Effects of antibiotic on the microbiota of mice

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Objectives

To investigate the impact of cefotaxime(CTX), cefuroxime(CFR), dicloxacillin(DCX), clindamycin(CLI) and ciprofloxacin(CIP) on the intestinal microbiome in mice.

Methods

Four weeks old, female NMRI mice (5/antibiotic) were treated with the antibiotics s.c. once daily for 3 days (mouse dose in mg/kg): (CTX; 60), (CFR; 120), (DCX;60), (CIP;15) and (CLI;50). Faeces were collected directly from each mouse at days 1, 3 and 5. The intestinal microbiotas were profiled by analysis of faeces samples by use of IS-pro; based on the species-specific length and phylum-specific sequence polymorphisms of the IS region of 16S rDNA. Samples were analyzed by IS-pro with fluorescent probes binding to the phylum-specific rDNA. IS profiles consist of a set of peaks with: (A) a specific length, measured in nucleotides and (B) a specific height, measured in relative fluorescence units.

Results

Are given as the individual sums of three phyla: *Bacteroidetes* (Gram-negative anaerobic), *Firmicutes* (containing most Gram-positives) and *Proteobacteria* (including *E.coli, Salmonella* and other spp.). The ratio between day 1 and day 3 are given when appropriate. CIP completely inhibited the *Proteobacteria* (ratio 0.026). CLI inhibited the *Bacteroidetes* (ratio 0.00097) allowing for the two remaining phyla to proliferate. CTX allowed for some overgrowth of all three phyla while DIC seemed to inhibit the *Bacteroidetes* (ratio 0.66) leading to a subsequent increase in *Proteobacteria* (ratio 2.1). CLI and CIP had an impact on the flora which changed the phyla composition throughout the study.

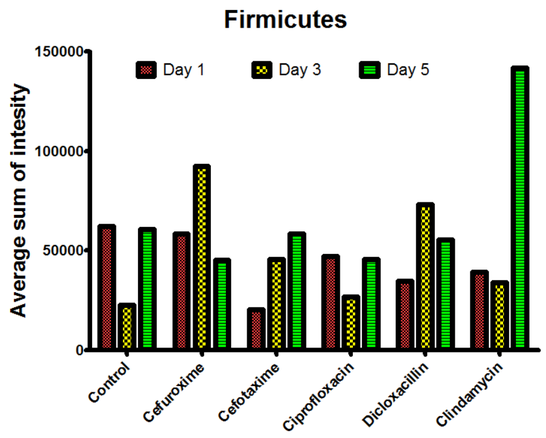

Figure 1: Showing the average sum of intensity of the phylum Firmicutes. Days 1, 3 and 5 are shown for each antibiotic.

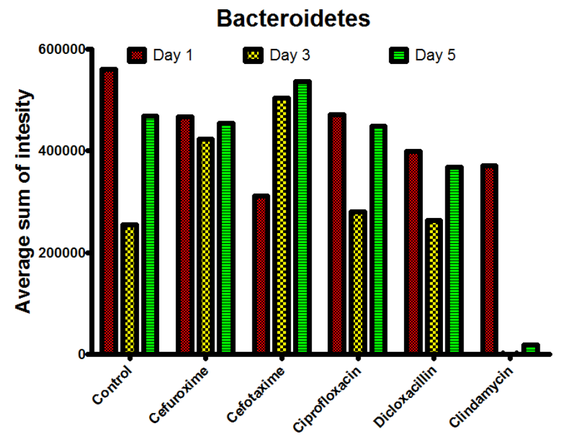

Figure 2: Showing the average sum of intensity of the phylum Bacteroidetes. Days 1, 3 and 5 are shown for each antibiotic.

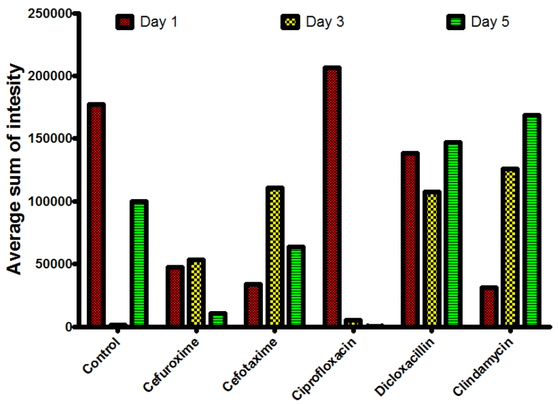

Figure 3: Showing the average sum of intensity of the phylum Proteobacteria. Days 1, 3 and 5 are shown for each antibiotic.

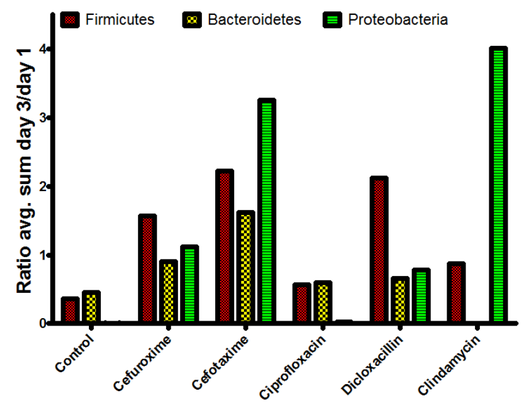

Figure 4: Showing the ratio of average sum of intensity on day 3 divided with day 1. Shown for each phylum and each antibiotic.

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Conclusions

We found surprisingly few changes in the microbiota created by the cephalosporins. DIC and CLI exert their selective ability by inhibiting *Bacteroidetes* and changing the ratio between phyla. CIP had a major inhibiting impact on the *Proteobacteria*. We therefore identified the likely reasons for the selective abilities of CLI and to some extent DIC, while the lack of selection from CIP, as preciously found by Boetius Hertz et al., remains unclear.