

INFECTION

Battle of the bugs — chitosan prevents recurrent UTI

Coadministration of a bladder cell exfoliant and antibiotic treatment fully eradicates uropathogenic *Escherichia coli* (UPEC) from the bladder of mice and prevents recurrent UTI, according to new data published in the *Journal of Infectious Diseases*.

Chitosan is a cationic polysaccharide obtained by partial N-deacetylation of chitin (which is a component of the exoskeleton of insects). It acts as a bladder cell exfoliant and has previously been shown to be effective at reducing UPEC titres *in vivo* when given before ciprofloxacin for UTI. However, a single treatment did not prevent infection recurrence.

The results of the current study show that repeated administration of chitosan in combination with ciprofloxacin can completely eliminate UPEC from mouse bladders. Adult female mice were inoculated with UPEC cystitis isolate UTI89 via transurethral catheterization and the presence of intracellular

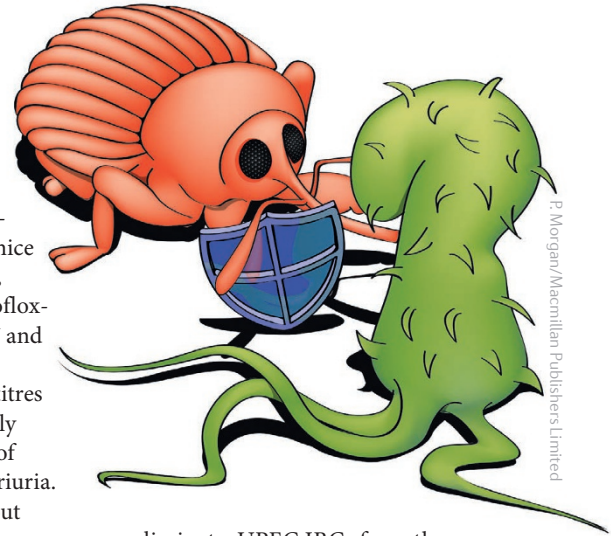
bacterial communities (IBCs) was confirmed by immunofluorescence. The mice were split into three groups: untreated, chitosan alone, and chitosan plus ciprofloxacin, and treatment was given at 1, 4, 7 and 14 days after UTI inoculation.

Untreated mice had high bacterial titres at day 14, which declined approximately 10-fold by day 32, by which time 17% of untreated mice were positive for bacteriuria. Treatment with chitosan with or without ciprofloxacin reduced bacterial titres in these mice below the limit of detection by day 14. At this time point, 10% of mice that received chitosan alone and none of mice that received the combination had bacteriuria. At day 32, no mice in the combination group had bacteriuria. Furthermore, the bladder urothelium rapidly recovered from repeated exposure to chitosan.

These data suggest that repeated treatment with chitosan plus ciprofloxacin

can eliminate, UPEC IBCs from the bladder without causing lasting damage to the bladder urothelium. This therapy combination is promising for treating recurrent UTI.

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ORIGINAL ARTICLE Erman, A. N. *et al.* Repeated treatments with chitosan in combination with antibiotics completely eradicate uropathogenic *Escherichia coli* from infected mouse urinary bladders. *J. Infect. Dis.* <http://dx.doi.org/10.1093/infdis/jix023> (2016)