

Japanese multi-herbal medicine, Hochuekkito, protects cyclophosphamide-induced neutropenic mice from *Streptococcus pneumoniae* lung infection by inducing various antimicrobial proteins

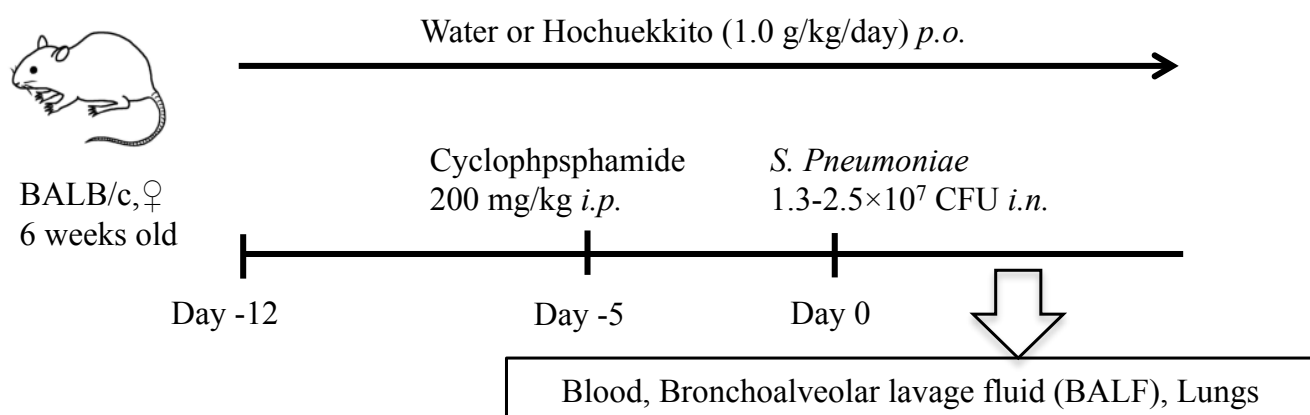
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Back ground

- With a recent increase of drug-resistant bacteria, a multidisciplinary approach is required for infection control in acute care.
- We investigated whether the Japanese multi-herbal formula Hochuekkito (HET) could prevent *Streptococcus pneumoniae* pulmonary infection in cyclophosphamide (CY)-induced neutropenic mice.

Methods (Schedule of animal experiment)



Hochuekkito (補中益気湯)

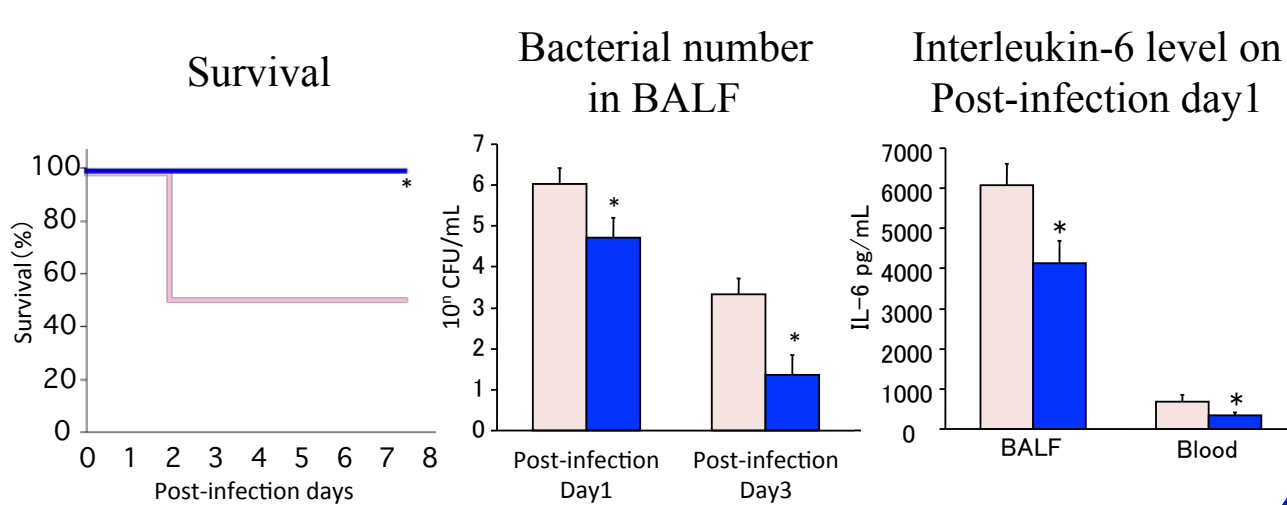
普普 Hedysari Radix	人參 Ginseng Radix	当歸 Angelica Radix	陳皮 Citri Unshiu Pericarpium	大棗 Zizyphi Fructus	蒼朮 Atractylodis Rhizoma	柴胡 Bupleuri Radix	甘草 Glycyrrhizae Radix	升麻 Cimicifugae Rhizoma	生薑 Zingiberis Rhizoma

- Traditional Japanese multi-herbal medicine that consists of 10 herbs.
- Used for the treatment of various symptoms related to general weakness.

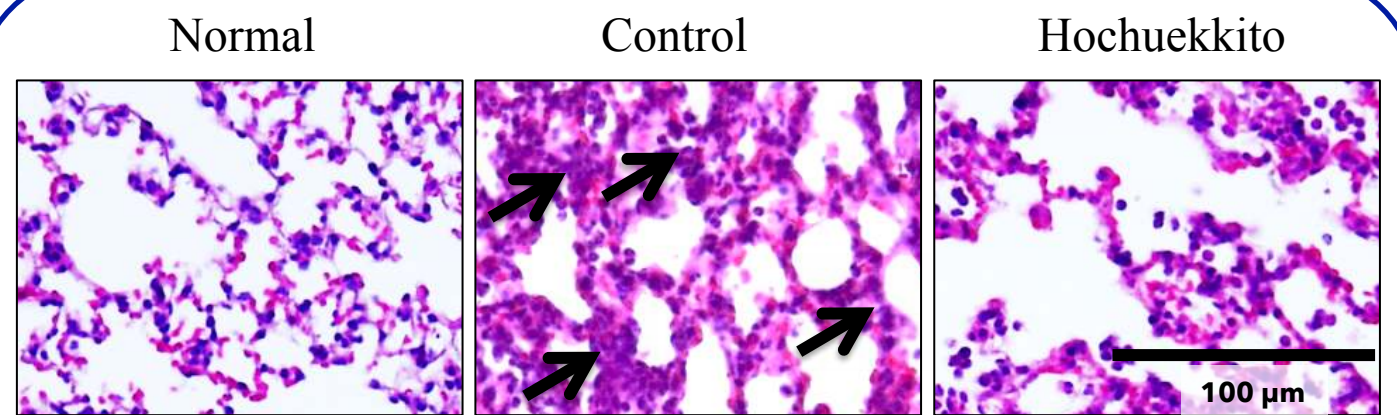
Results

Control group (light blue), HET-treated group (dark blue). Data were presented as mean ± standard error, * p<0.05

Antibacterial effects of Hochuekkito

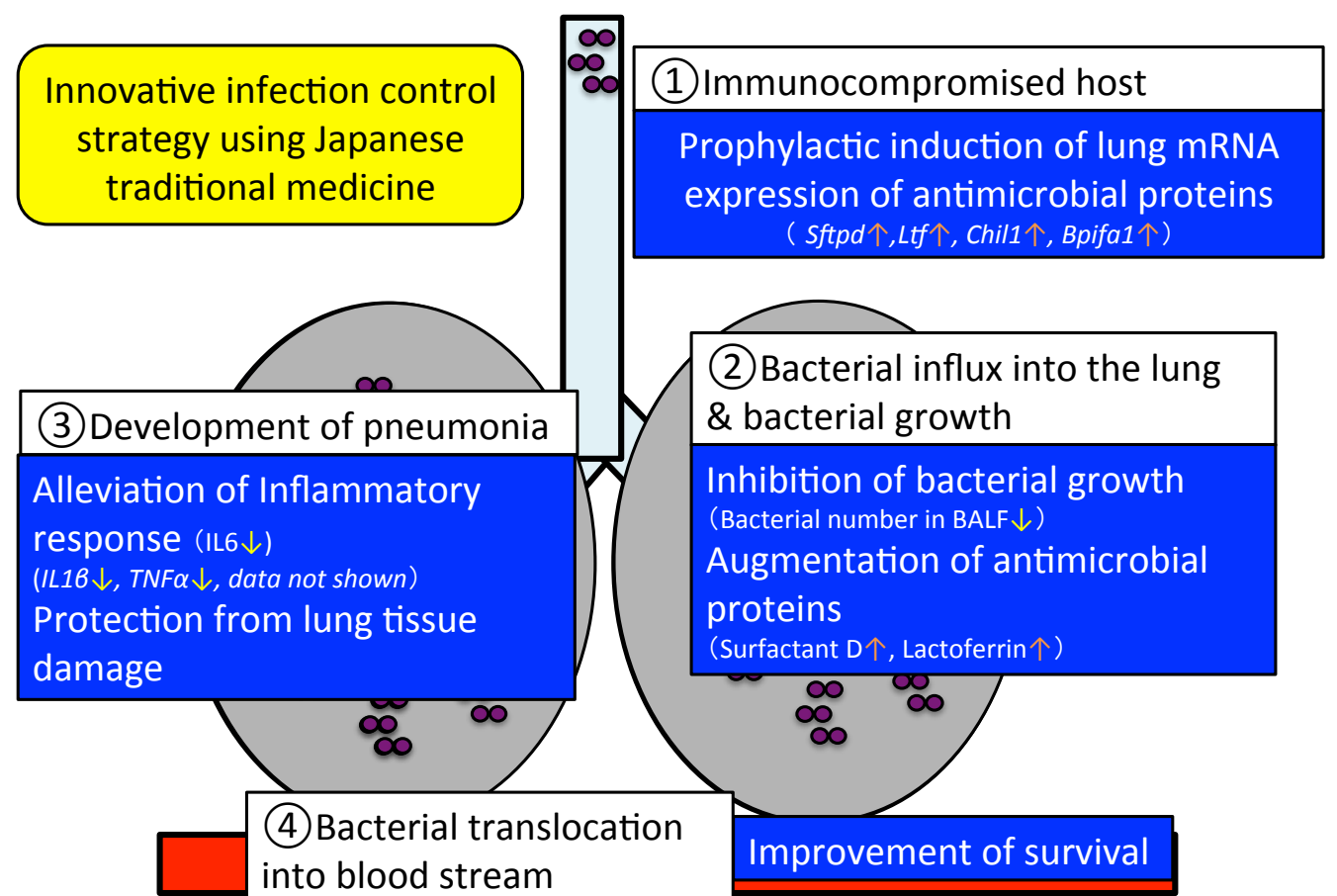
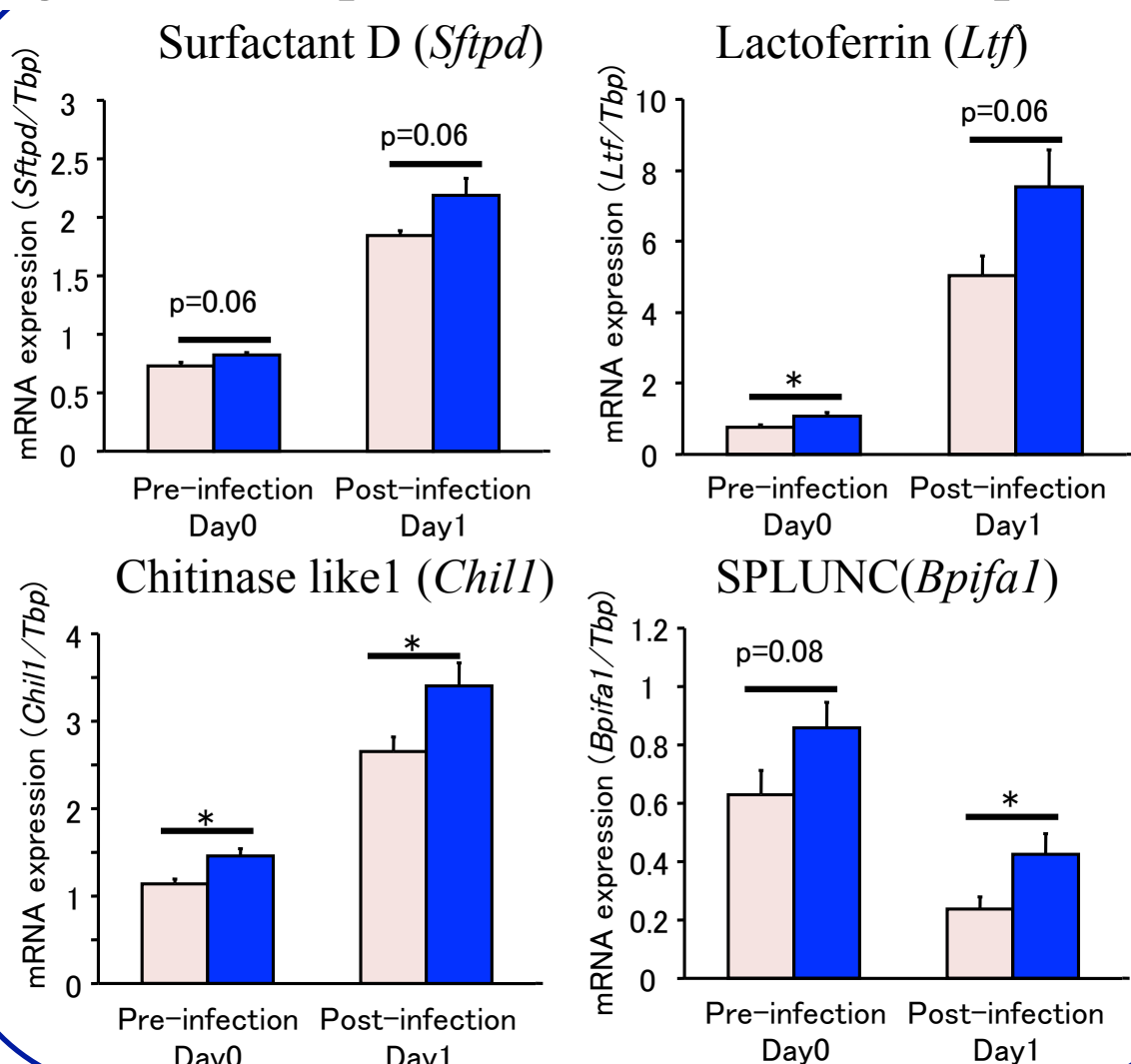


Lung injury



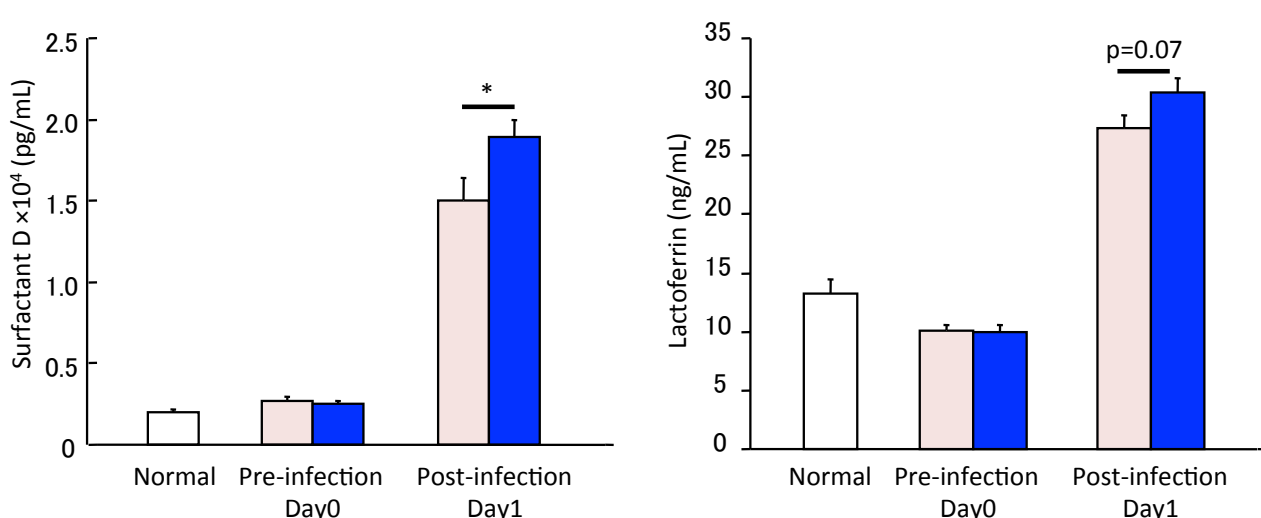
Pathohistological examination, hematoxylin and eosin stain (×200)
Streptococcus pneumoniae infection induced thickening of the alveolar wall (black arrows) in CY-induced neutropenic mice. These pathological findings in lung were attenuated in the Hochuekkito-treated group

Lung mRNA expression of antimicrobial proteins



Possible mechanism of Hochuekkito

Surfactant D and Lactoferrin in BALF



Conclusions

- Prophylactic treatment using Hochuekkito successfully protected CY-induced neutropenic mice from *S. pneumoniae* pulmonary infection by inducing multiple antimicrobial proteins.
- Hochuekkito can be an additional option for achieving more effective infection control in immunocompromised patients.