

## COLLECTION AND PRELIMINARY ANTI-BACTERIAL SCREENING OF PLANTS USED IN TRADITIONAL MEDICINE

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In light of the emergence of antibiotic resistance and lack of new drugs, herbal drug and antibiotic combinations may represent an interesting therapy option for treating multidrug resistant bacteria.

2008 our research started to explore the antibiotic mechanism of a Traditional Chinese Medicine (TCM) and strategies for multidrug resistant bacteria. At this time Dr. Wang Yi was granted a post-doc scholarship for 6 months by EURASIA Pacific Uninet at the Institute of Pharmaceutical Sciences, University of Graz to perform this project under the supervision of Prof. Dr Adelheid Brantner. The antibacterial activity of an herbal TCM formulation which is composed of extracts from *Scutellariae radix*, *Ursi fel*, *Naemorhedi cornu*, *Lonicerae flos* and *Forsythiae fructus* was investigated. According to TCM, this formula clears heat and removes phlegm. In China it is used to treat respiratory tract infections.

During our study, we found that penicillin, a clinically routine anti-infective drug, showed inhibitory effects on the suspended bacteria as well as on the initial state of the biofilm formation. The minimum inhibitory concentration (MIC) is 8250 times higher than that of the TCM formulation. But when the bacteria form mature biofilms, the TCM formulation showed a strong bactericidal effect against these biofilm forming bacteria. The effective concentration is far lower than the blood drug concentration, but in contrast, penicillin has no effect on the mature biofilm. The results indicate that TCM and antibiotics have different antibacterial mechanisms, and also indicate the limitations of existing evaluation methods. We published our results in the *Journal of Ethnopharmacology* (Wang Y, Wang T, Hu J, Ren C, Lei H, Hou Y, Brantner AH. Anti-biofilm activity of TanReQing, a Traditional Chinese Medicine used for the treatment of acute pneumonia. *J Ethnopharmacol.* 134(1),165-170, 2011). Our research on this very important topic of anti-infective TCM drugs is still ongoing. So in August 2018 Prof Dr Adelheid Brantner visited the CACMS in Beijing to discuss further cooperation projects on this topic.

September 2018 Prof Dr Wang Yi from the CACMS in Beijing performed some experiments at the Institute of Pharmaceutical Sciences and the Institute of Molecular Biosciences, University of Graz on the *in vitro* antibacterial activity of TCM plants and possible synergistic interactions with selected antibiotics against Methicillin-Resistant *Staphylococcus aureus* (MRSA) by the microdilution method. Possible synergies were studied with the checkerboard technique and the time kill curve assay. Obtained values of the fractional inhibitory concentration index suggested no interactive effects of the tested combinations. Our study demonstrated that the investigated TCM drugs inhibited the growth of planktonic *Staphylococcus aureus* as well as bacterial cells embedded in a biofilm. It showed synergistic interactions with conventional antibiotics against MRSA. On the platform of EPU we have also explored the goals of mutual interests. In the frame of this EPU project scientists from the CACMS in Beijing and different Institutes from the University of Graz had the possibility to create a network which aims at establishing contacts and scientific partnerships.