In vitro antiproliferative activity of *Porina internigrans* and *P. mastoidea* (Porinaceae, Ostropales) crude extracts against human cancer cells

Kajonsak Vongshewarat[1,2], Sureeluk Rodthong[2], Pongpan Siripong[3], Kansri Boonpragob[1]

[1]Faculty of Science, Ramkhamhaeng University, Bangkok, Thailand, [2]Institute of Science, Suranaree University of Technology, Nakhon Ratchasima, Thailand, [3]Research Division, National Cancer Institute, Bangkok, Thailand

Porina spp. consists of forty-one species in Thailand. *Porina internigrans* and *P. mastoidea* commonly colonize moist evergreen forest, dry evergreen forest and plantation. The aim of this study was to investigate in vitro antiproliferative activity of crude extract of the two lichens by using different solvents with increasing polarity. The lichens underwent extraction with chloroform and methanol using the maceration process. The cytotoxic activities of the four lichen extracts were evaluated in vitro using three human cancer cells – KB (human epidermoid carcinoma), $HepG_2$ (human hepatocellular carcinoma) and HeLa (human cervical carcinoma) – and sample of non-cancerous cells, Vero (African green monkey kidney cells). The inhibition of cell proliferation by the crude extracts were determined by MTT colorimetric assay and active standard value at IC_{50} 30 µg/ml. The crude chloroform extracts of the two lichens had activity against KB, $HepG_2$ and HeLa at the IC_{50} values of 0.3–40, 0.2–37.5 and 0.3–60 µg/ml, respectively. The methanolic extract of *P. internigrans* had weaker activity than that of *P. mastoidea*. However, it exhibited lower toxicity with normal cells than other crude extracts, except the crude chloroform extract of *P. mastoidea*. Purification and identification of the bioactive components from these lichens are under investigation.

Phylogenetic position, metabolic profile, and antibacterial extracts of the Antarctic lichen *Himantormia lugubris*

Andreas Beck[1,2], Veronika Kuhn[3], Wolfgang Eisenreich[3], Pradeep K. Divakar[4], Cinthya Beleén Cabrera Rojas[5], Mauricio Cuellar[5], Wanda Quilhot[5], Julia Bechteler[1], Gerardo Gonzalez Rocha[6], Angélica Casanova-Katny[6]

[1]Botanische Staatssammlung München, Germany, [2]GeoBio-Center, LMU, Munich, Germany, [3]Technical University Munich, Germany, [4]Facultad de Farmacia, Universidad Complutense, Madrid, Spain, [5]University of Valparaiso, IN, USA, [6]LIAA, University of Concepción, Chile

Lichen forming fungi produce a tremendous diversity of metabolites, with at least 1050 metabolites described so far. To elucidate the properties of some of these in more detail, we obtained the metabolomic profile of the Antarctic endemic *Himantormia lugubris*. The phylogenetic position based on a six-gene phylogeny (ITS, nuLSU, mtSSU, RPB1, Mcm7 and Tsr1) shares a sister relationship with *Coelopogon* and *Menegazzia*. Metabolic profiles were determined by non-targeted 1H-NMR and GC-MS analysis of a methanolic extract. 5,7-Dihydroxy-6-methyl-phthalide was identified as a key marker compound. Specimens growing on either rock or mosses did not differ in their main secondary metabolites. Antibacterial activity of the extracts was screened against multidrug-resistant bacterial strains isolated from clinical specimens in Chilean hospitals. Most of the bacterial strains – methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), *Escherichia coli* and *Acinetobacter baumannii* – were inhibited in their growth or killed at concentrations >100 g/mL. *Klebsiella pneumonia*, however, were killed only by concentrations >250 g/mL.

Yellow species of genus *Rhizocarpon* and their secondary metabolites in the Czech Republic

František Bouda

Natural History Museum, Prague, Czech Republic

As part of a herbarium revision of yellow *Rhizocarpon* species group, we examined also secondary metabolites in lichen thalli. 14 *Rhizocarpon* species was identified by presence of specific lichen acids determined by TLC. *Rhizocarpon geographicum* group has shown high intraspecific variability of secondary metabolites and also frequent morphological transformation. Three species *Rhizocarpon ferax*, *R. riparium* and *R. sorediosum* have been discovered for the first time in the Czech Republic. It seems that current investigation of chemical and morphological characters could show interesting results if compared with molecular phylogenetic.