Anticancer Compounds from Indonesian Marine Invertebrates

Putra, M.Y. (Indonesian Institute of Sciences), Luesch, H. (University of Florida)

Introduction

Currently, the Food and Drug Administration (FDA) in the United States has approved three marine drugs for anticancer, namely Brentuximab vedotin (Adcetris®, discovered in mollusk/cyanobacterium), Cytarabine (Cytosar-U®, discovered in sponge), Eribulin Mesylate (Halaven®, discovered in sponge). The European Medicines Agency (EMA) approved a marine-derived anticancer drug, namely, Trabectedin (Yondelis®, discovered from Tunicate). In addition, 23 marine-derived compounds are either in phase I, phase II or phase III clinical trials, and several hundred novel marine compounds are in the preclinical pharmaceutical pipeline (Mayer, 2015). Anticancer or cytotoxic activity was exhibited by 34 compounds from Indonesian marine organisms. Among all organisms screened, sponges and soft corals represent one of the most promising sources of marine bioactive compounds particularly for anticancer or cytotoxic activity (MarineLit, 2014).

Experimental

Two marine invertebrates from Indonesia, soft coral Sinularia sp and Sponges Stelletta clavosa were homogonized and repeteadly extracted with MeOH and CHCl3 at room temperature to obtain crude extract. The crude extracts were partitioned against H2O and EtOAc to give an acetate extract, while water will partitioned against n-BuOH, thus affording a butanol extract. The ethyl acetate extract will chromatographed by silica gel (230-400 mesh) column chromatography eluting with a gradient system of increasing polarity from n-hexane to EtOAc to MeOH. The colon cancer adenocarcinoma HCT 116 and breast cancer MD-MBA-231 cell line were used for anticancer screening and the protocol according to the manufacture's protocol (Promega) (Liu et al., 2010). All promising fractions for anticancer activity will be purified using the available infrastructure, i.e. HPLC, gel chromatography or potentially gravity-driven open silica-gel chromatography. Structural elucidation will be a central task to provide new, fully characterized molecules for the potential development of natural anticancer. The planar structures of all new compounds will be elucidated using UV, IR, [α]D, 1D and 2D NMR (1H, 13C, COSY, HMBC, HSQC,) and HR-MS/MS data.

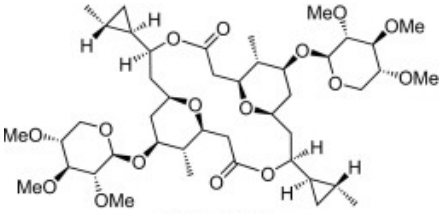
Results and Discussion

1) Soft corals Sinualria sp

The extract of *Sinularia* sp, yielded three known sterols and one new sterol compounds. The structures of the known metabolites Sinugrandisterol A, 23-Norgorgost-7-ene-3,5,6-triol, (3b,5a,6b), Ergosta-5,22-diene-1,3,7-triol, (1a, 3β, 7a, *22E, 24S*) were assigned through the comparison of their spectral data with those reported in the literature.

2) Sponges stelletta clavosa

The extract sponge *Myriastra clavosa* resulted one known compound named Clavosolide A. The structures of the clavosolide A were elucidated by interpretation of spectroscopic data and compared with the literature.



Clavosolide A

Conclusions

Indonesian marine invertebrate soft corals Sinularia sp and sponges Myriastra clavosa resulted four known compounds and one new compounds and some of them still analyze for the anticancer and yeast chemogenomic.

Acknowledgements

The National High Magnetic Field Laboratory is supported by the National Science Foundation through NSF/DMR-1157490/1644779 and the State of Florida.

References

[1] Mayer, A.M.S. Marine pharmaceuticals: the clinical pipeline. Available online: http://marinepharmacology.midwestern.edu/clinPipeline.htm (accessed on 25 Januay 2015)

[2] MarinLit Database™, 2012, University of Canterbury, Christchurch, New Zealand. Available online: http://www.chem.canterbury.ac.nz/marinlit/marinlit.shtml (accessed on 25 August 2015).