UDC 615.32 DOI: 10.25808/08697698.2018.202.6S.060

E.A. PISLYAGIN, E.S. MENCHINSKAYA,
O.F. SMETANINA, E.A. YURCHENKO

Influence of same marine fungi metabolites on reactive oxygen species level in neuroblastoma cells

Key words: Parkinson's disease, marine fungi metabolites, reactive oxygen species, Neuro 2A

Parkinson's disease is a chronic progressive disease of the brain, mainly associated with degeneration of dopaminergic neurons of a black substance and manifested by a combination of hypokinesia with rigidity, resting tremor and postural instability [5, 1]. Parkinson's disease (PD) is one of the most common neurodegenerative diseases of man, being the second after Alzheimer's disease, therefore PD is an extremely complex and socially significant problem of modern medicine [1].

Astaxanthin (which have marine origin) showed neuroprotective effect in in vitro models of Parkinson's disease, a significant inhibition of apoptosis and the formation of intracellular reactive oxygen species (ROS) in cells treated with 6-hydroxydopamine (6-OHDA) [2]. In this regard, a targeted search for marine substances with antioxidant activity to detect candidate compounds for in vivo studies is actual.

The aim of the work is to screen the metabolites of marine fungi *Aspergillus candidus* KMM 4676, *Eurotium niveoglaucum*, *Aspergillus flocculosus* and *Penicillium* sp. KMM 4672 for their antioxidant potential.

In our work, 38 metabolites of marine fungi were studied for radical-scavenger activity against DPPH and using the fluorescent dichlorofluorescin diacetate probe, the effect of lead compounds on the formation of reactive oxygen species (ROS) under the action of 6-hydroxydopamine in mouse neuroblastoma Neuro 2A cells was evaluated. The DPPH-radical scavenging activity was shown by new terphenylline B (IC_{50}=73.1 μM). Also known polyketides tetrahydroauroglaucin, flavoglaucin, neohinulin and cryptoehinulin D (as racemate) was shown significant radical-scavenger activity (IC_{50}=55.5 μM, 58.1 μM, 62.6 μM, 58.0 μM, respectively).

Seven compounds showed a significant inhibition of ROS formation in 6-OHDA-treated Neuro 2A cells. It can be noted that, despite different approaches to the study of ROS level, terphenylline B and tetrahydroauroglaucin showed high activity in both tests. Isochromene [4] inhibited the ROS formation in Neuro 2A cells by 46%, while in the DPPH test, it was only 38%. Mactanamide [3] had no DPPH-radical scavenging activity but it was shown decreasing of ROS level in 6-OHDA-treated Neuro 2A cells to control value.

* PISLYAGIN Evgeny Alexandrovich – PhD, Researcher, MENCHINSKAYA Ekaterina Sergeevna– PhD, Researcher, SMETANINA Olga Feodorovna– Researcher, YURCHENKO Ekaterina Aleksandrovna – PhD, Researcher (G.B. Elyakov Pacific Institute of Bioorganic Chemistry, FEB RAS, Vladivostok, Russia). *E-mail: pislyagin@hotmail.com

The work was supported by RFBR grant № 18-34-00737

Thus, our data suggest the regulating effect of the same marine fungal metabolites on the level of active forms of oxygen and the redox status of neuronal cells abstract

REFERENCES:

1. Levin O.S., Fedorova N.V. Parkinson's disease. M. 2006. 256 p
2. Liu X., Shibata T., Hisaka S., Osawa T. Astaxanthin inhibits reactive oxygen species-mediated cellular toxicity in dopaminergic SH-SY5Y cells via mitochondria-targeted protective mechanism // Brain. Res. 2009. Vol. 1254. P. 18-27.
3. Lorenz P., Jensen P., Fenical W. Mactanamide, a new fungistatic diketopiperazine produced by a marine *Aspergillus* sp. // Natur. Prodt. Letters. 1998. Vol. 12. P. 55-60.
4. Smetanina O.F., Yurchenko A.N., Ivanets E.V., Kirichuk N.N, Khudyakova Y.V., Yurchenko E.A., Afiyatullov S.Sh. Metabolites of the marine fungus *Penicillium citrinum* associated with a brown alga *Padina* sp. // Chem. Nat. Comp. 2016. Vol. 52. P. 111-112.
5. Yakhno N.N., Khatiashvili I.T. Parkinsonism: a clinic, diagnosis and differential diagnosis // Russ. Med. J. 2002. Vol. 8. P. 418-425.