Marine sponge as a source of antiangiogenic compounds. The case of aeroplysinin-1

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The vast majority of the natural compounds that have been previously described as inhibitors of angiogenesis have been isolated from plants and terrestrial microorganisms, mainly due to their higher availability and because their therapeutic effects had been previously known in folk traditional medicines. However, increasing attention is being paid to the development of marine-derived antiangiogenic agents, probably fuelled by the increase in the number of marine-derived anticancer drugs which are being successfully used for cancer therapy. Marine organisms, adapted to survive in extreme environments by developing chemical means of defence, produce interesting and singular pharmacological lead compounds, derived from the large diversity of marine habitats and environmental conditions.

Among the many different types of marine organisms used as a source for drug discovery, sponges represent one of the most promising sources of leads in the research of new cancer drugs. Some angiogenesis inhibitors isolated from marine sponges have been described by us and others.

Aeroplysinin-1, a brominated metabolite extracted from the marine sponge Aplysina aerophoba, has been characterized by our group as a potent antiangiogenic compound in vitro and in vivo. Aeroplysinin-1 induces apoptosis in endothelial cells by a mechanism which involves activation of the BH3-only pro-apoptotic protein Bad, cytochrome c release and activation of caspases 2, 3, 8 and 9, what indicates a relevant role of the mitochondria in the apoptogenic activity of this compound. Recent results suggest that aeroplysinin-1 could also be a novel potential anti-inflammatory compound. These results open new ways to the potential pharmacological action of aeroplysinin-1 not only on angiogenesis and cancer, but also on atherosclerosis and inflammation-dependent diseases.

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