

pyrazole, thiophene, furan and isoxazole rings respectively.2-4 Many other analogues of the marine nortopsentins such as 2,4-bis(3'-indolyl)thiazoles 5, in which the heterocyclic core of the system is constituted by thiazole, have been synthesized. These derivatives possessed strong inhibitory activity against a wide range of human tumor cell lines. In this series replacement of one indole system with a six-membered ring increases the antitumor activity against leukemia and renal cancer cell lines.5 In the attempt of looking for novel antitumor compounds, we thought it was interesting to synthesize new azaanalogues of type 6 in order to verify the possible increase in the antineoplastic activity. We have also synthesized 3-(2-phenyl-1,3-thiazol-4-yl)-1H-indole derivatives of type 7,8.

The antitumor activity and the mechanism of action of nortopsentin heteroanalogues will be discussed.

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### **PTHrP expression and mesenchymal stem cell differentiation.**

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It is known that multipotent mesenchymal stem cells (MSC) show the capacity for multilineage mesenchymal differentiation. In particular, MSC can differentiate towards osteoblasts, adipocytes and chondroblasts using in vitro tissue culture-differentiating conditions [1]. Adipose tissue is an accessible and rich source of adult MSC (AMSC) which can be isolated from liposuction specimens and cultured [2]. Adipogenic and osteogenic differentiation can be obtained after 28 days, and confirmed using staining techniques and checking the expression of specific genes [3]. Although the

differentiation of AMSC from adipose tissue into the adipogenic and osteogenic phenotypes are standard procedures, the underlying molecular mechanisms and pathways are still poorly understood. To better understand the potentials of AMSC in cellular therapy and in tissue engineering, it is important to study the initial commitment and differentiation of these cells, by the identification of novel regulatory genes and factors involved in the processes of early adipogenesis and osteogenesis.

Parathyroid hormone-related peptide (PTHrP) is a regulator of cellular proliferation, differentiation and apoptosis in many cell types [4, 5]. To search for stemness/differentiation markers, we aimed to study PTHrP gene expression, with particular interest to its splicing isoforms, to highlight when the chronological expression of the different variants, if any, starts and whether it varies over time, both in control stem cells and in those induced to differentiation.

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### **Chemistry and bioactivity of natural products**

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Natural products have been the most successful source of drugs ever. Historically, the most important natural sources have been plants. Research has followed two main lines: ethnopharmacology and toxicology that have produced many valuable drugs and are likely to continue to produce lead compounds.