
An ecological model of invasion and metastasis.

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It has been argued that malignant tumours represent complex dynamic and self-organizing ecosystems [1-3]. Furthermore, there is increasing evidences that collective cell migration occurs during invasion and metastasis. Such a collective cell migration is now recognised as being an important (and often the predominant) mode of invasion in a wide range of tumours. Our hypothesis is that cancer cells may be capable of developing multicellular collective patterns, based on a cooperative behaviour and that the level of cooperativity can be evaluated from the cancer front propagation behaviour. Here we propose a mathematical model showing how these properties could arise in tumours and why the emergence of such swarm-like patterns would confer advantageous properties to the spatio-temporal expansion of tumours. Consequently, this model illustrates why understanding and ultimately targeting such collectivity should be of interest for basic knowledge and clinical treatment of cancer, including rare tumours.

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Supported by grants BIO2014-56092-R (MINECO and FEDER), P12-CTS-1507 (Andalusian Government and FEDER) and funds from group BIO267 (Andalusian Government). The work of RM is supported by a contract of CIBERER as research Doctor. The "CIBER de enfermedades raras" is an initiative from the ISCIII (Spain).
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