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The bone ecosystem

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Several types of cancer initiate or metastasize to the bone. These include the most prevalent and lethal cancers: lung, breast and prostate. Thus understanding the bone ecosystem is key if we want to predict what phenotypes will successfully metastasize to the bone and the subsequent evolutionary dynamics that will ensue as the invading tumour cells learn how to co-opt the bone resident cells. This bone ecosystem is very dynamic and responds and maintains homeostasis as micro and macro fractures appear. A variety of homeostatic processes emerge from the interactions of a myriad of cell types and signalling factors. Here I will present mathematical models, biologically motivated and tested, that explain bone repair and homeostasis and allow us to explore how tumours can grow in the bone as well as the impact of a variety of treatments not only on the tumour cells but also on the bone ecosystem.

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