Featured Publication Note: Imaging of tumor clones with differential liver colonization

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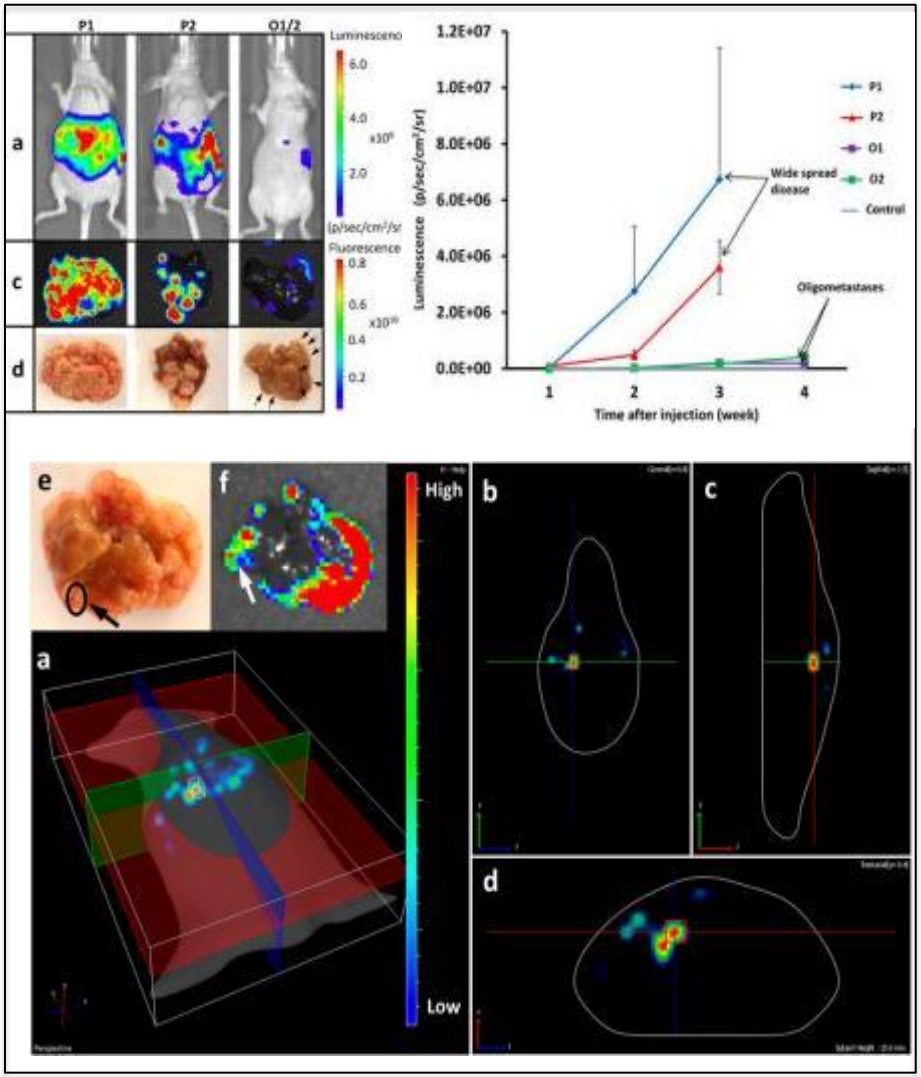
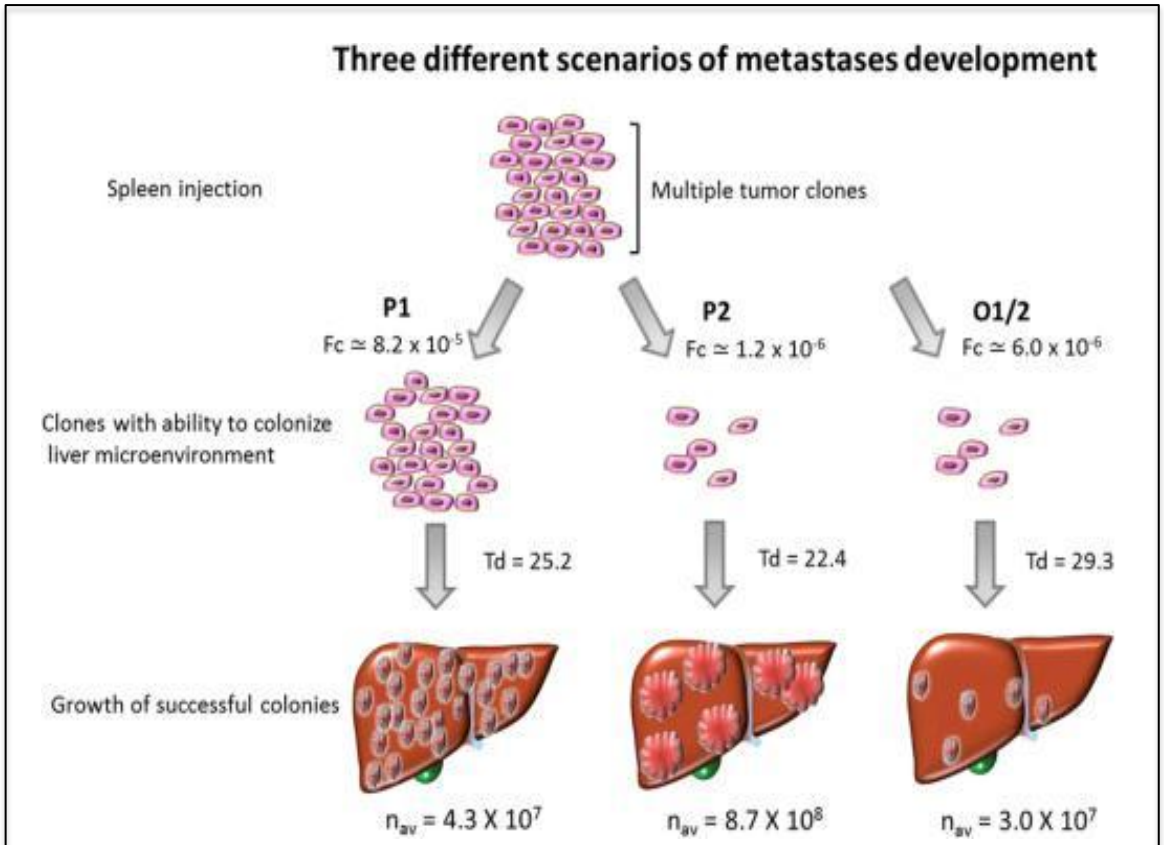
Colorectal cancer patients often develop liver metastases and thus, frequently have poor prognosis. There additionally appears to be a vast heterogeneity in their liver metastatic disease, a characteristic that hasn't been adequately explored in animal models of colorectal cancer. While bioluminescence imaging (BLI) has been widely used to non-invasively monitor colorectal cancer and liver metastastic development *in vivo*, a study specifically emphasizing their growth rates and colonization efficiencies within the liver microenvironment hasn't been attempted until now.



The authors used a combination of dual optical reporters (luciferase and tdTomato), *in vivo* 2D BLI and *ex vivo* analysis to longitudinally detect, quantify and resolve metastatic colonies. 3D bioluminescence tomography (DLIT) was used to further validate the spatiotemporal dynamics of metastatic development.

Imaging was used to screen 16 individual clones and identify 2 polymetastatic clones (P1 and P2) that form widely disseminated metastatic tumors and 2 oligometastatic clones (O1/2) characterized by a limited metastatic phenotype. Further quantification of their growth and colonization ability by imaging revealed:

- P1 has a high colonization potential but a low growth rate → large number of small metastatic tumors
- P2 has lower colonization capacity but faster doubling time → small number of large secondary tumors
- O1/2 show lower colonization efficiencies and lower growth → limited metastatic disease (oligometastatic)



The authors thus conclude that the manifestation of liver metastatic disease is an interplay of two key parameters: their doubling time (Td) and their efficiency in colonizing the liver (Fc).

Oshima et al. (2015), Imaging of tumor clones with differential liver colonization. Scientific Reports 5, Article number: 10946.