

Algorithms for Tumor Phylogenetics

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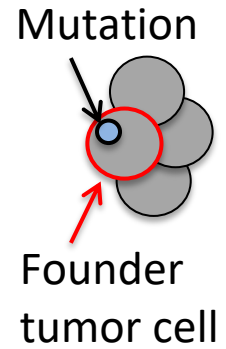
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Tumorigenesis: (i) Cell Mutation

Clonal Theory of Cancer

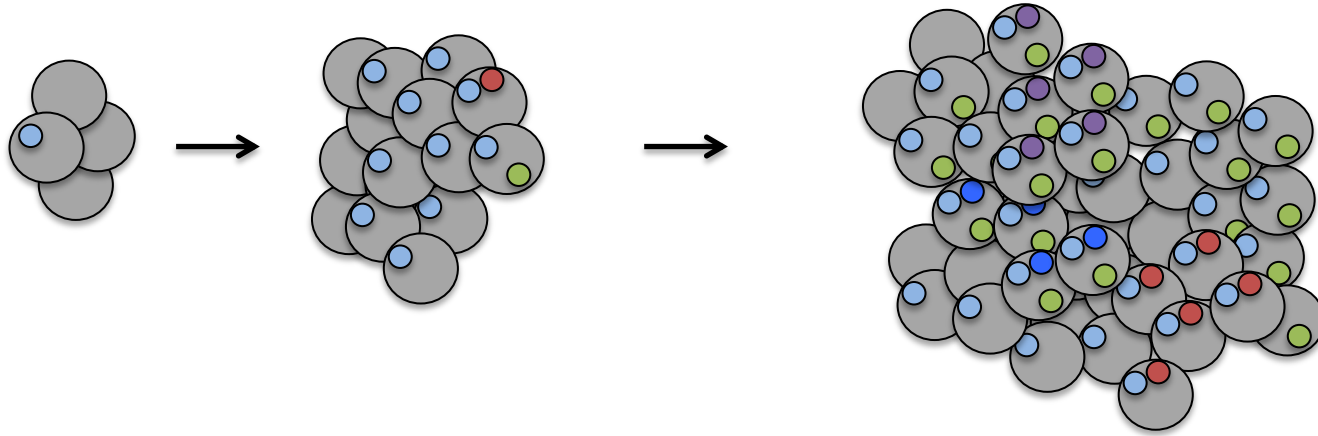
[Nowell, 1976]



Tumorigenesis: (i) Cell Mutation, (ii) Cell Division

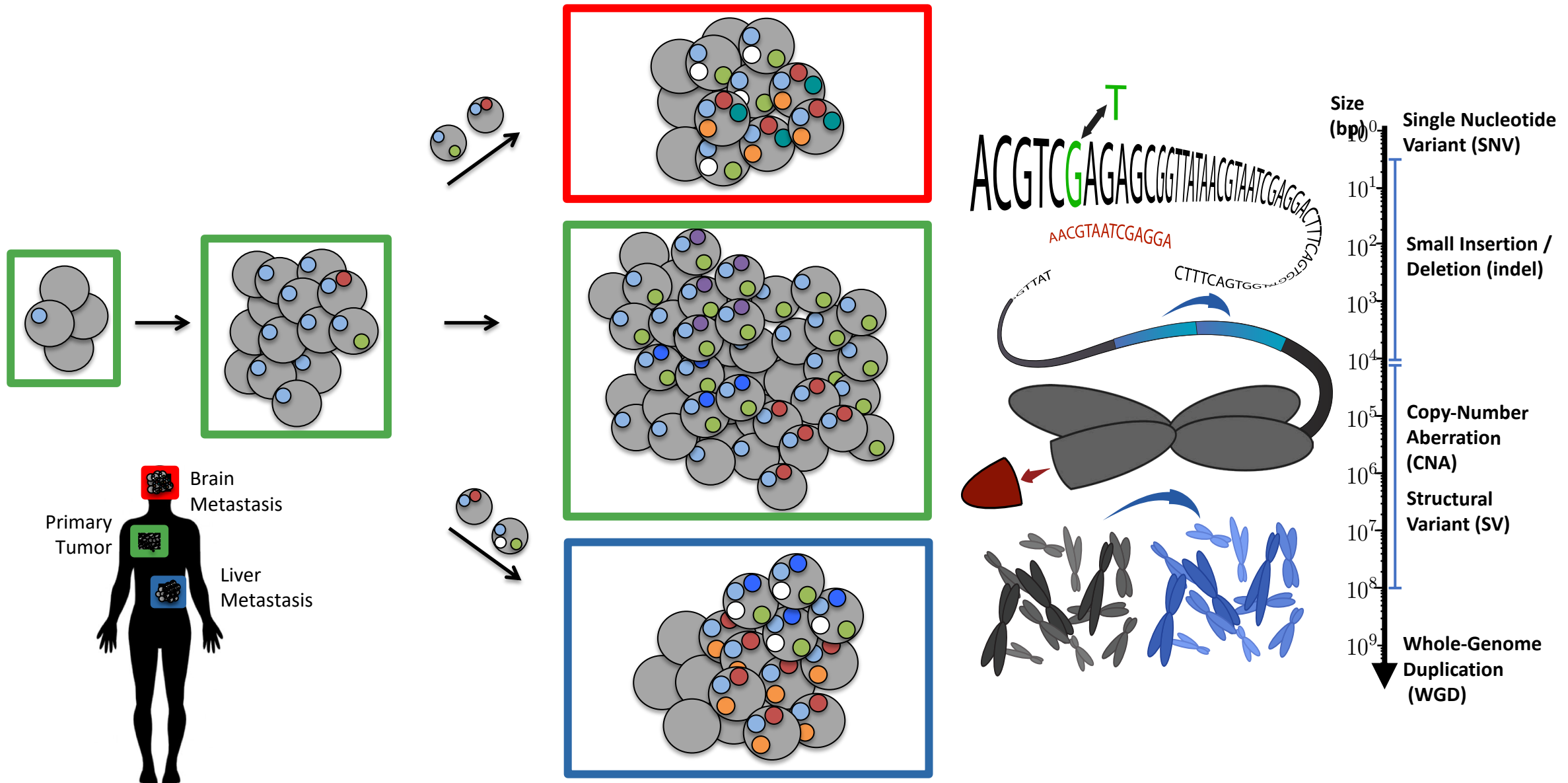
Clonal Theory of Cancer

[Nowell, 1976]

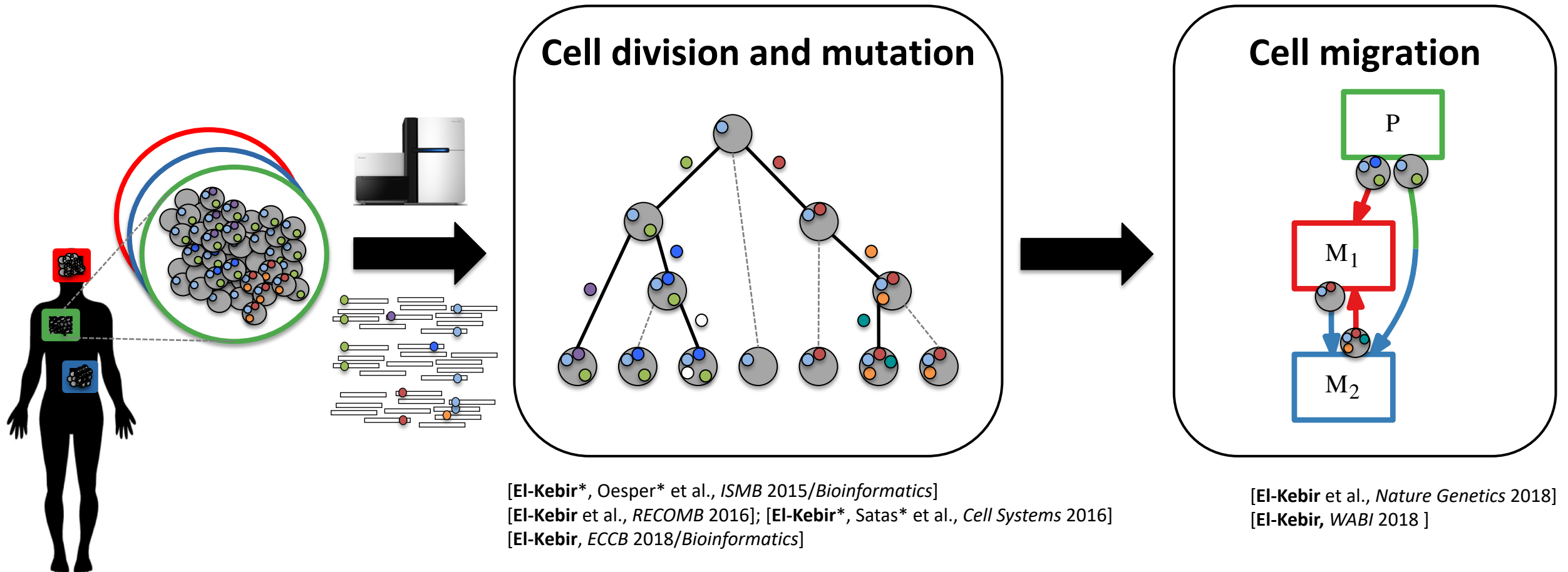


Heterogeneous Tumor

Tumorigenesis: (i) Cell Division, (ii) Mutation & (iii) Migration



Research: Algorithms for Reconstructing Cancer Evolution



Precise mathematical models are needed to describe the evolutionary process in cancer

Bigger Picture

‘Nothing in ~~biology~~ **cancer** makes sense except in the light of evolution.’

- Large-scale comparative tumor phylogenetics to identify common patterns of tumor evolution: *Landscape of tumor phylogenies*.
- Algorithms and translatable model systems to uncover spatiotemporal dynamics of tumorigenesis.
- Novel algorithms to study the interplay of intra-tumor heterogeneity, the microbiome and the immune environment.
- We should be treating tumor clones rather than individual mutations.