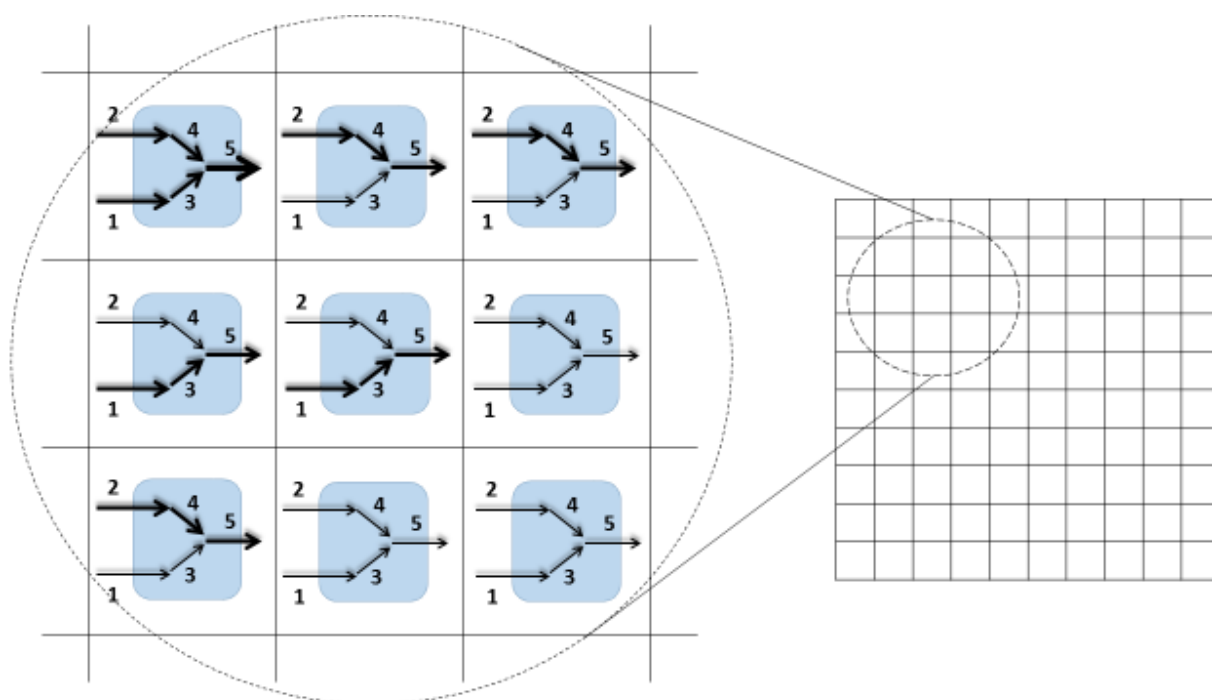


## Supplementary Figure S1

### Ghadiri et al., “A multiscale agent-based framework integrated with a constraint-based metabolic network model of cancer for simulating avascular tumor growth”



**Figure S1: A simple presentation of how an agent-based framework is integrated with the constraint-based modeling.** Each of the blue rectangles represent a cancer cell (or agent) including its corresponding metabolic network. The inward and outward arrows represent the uptake and secretion reactions, respectively. The thickness of each arrow is proportional to the flux value of its corresponding reaction. Flux balance analysis (FBA) is performed based on the maximum possible flux of the uptake reactions, which is determined by accessible concentration of metabolites in each cubicle. Therefore, the flux value of uptake reactions (or the consumption of metabolites) and most importantly, the biomass production reaction is determined for each cell. As depicted in different cells, these values varies from cell to cell.