

11.127

Divide and Conquer: Game Evolution

Divide and Conquer, initially just called “ChemGame”, evolved significantly since the beginning of this project. Initially the focus was on the principle of chemical bonding, and how chemical bonds store energy and require energy to break. This evolved somewhat into the way glucose is turned into energy and the role ATP plays as the “currency” of the body. The idea for using ATP as a currency persisted as it has a role in all aspects of metabolism. As we discussed the role breaking/making chemical bonds play in biochemistry, it quickly became clear that ruling, scoring, and gameplay would get very complex, and we were unclear as to how to best translate this idea into a game mechanic. One other idea that surfaced was the role that enzymes play in catalyzing reactions in the body.

Initially lots of the ideas were very organic chemistry based and slowly evolved into more biochemistry. The major shift occurred in part due to the thought that biochemistry is somewhat more accessible to beginning students and would be easier to showcase to our class. As we shifted our focus and thought about subject matter that is more intuitive to beginners, the game morphed more and more into a biochemistry/metabolism game. The use of ATP as cellular currency remained, but the chemical bonding idea was abandoned. As we shifted the focus we also dropped enzyme chemistry out of the equation as we tried to make it more and more novice-friendly.

Eventually, as the game mechanics were conceived it became very metabolism based, with the dynamics of the game focused on the breakdown of different foodstuffs and the generation of energy. On its own, abstracting away pathways like glycolysis and lipid oxidation into black boxes seemed somewhat less interesting and was difficult to do, being biologists/chemists. As such, we introduced both catabolism (breakdown) and anabolism (synthesis) of biomolecules into the game, with an implicit focus on how the body prioritizes protein synthesis over protein breakdown for energy.

As gameplay was further developed, enzymes were placed back into the mix to make the game more interesting and to add an additional learning point for students. We looked to Agricola in an effort to adapt the action restriction mechanism. Then, the idea of basing the action restriction mechanism around the availability of enzymes and ATP was conceived. This played very well into the existing mechanics and made the game much more interesting.

The end goal of the game also changed over time. Initially it was who could use the fewest ATP to make new molecules. This quickly morphed into who could achieve the most ATP over time. We settled on the goal of dividing your cell with a secondary goal of gaining the most ATP.

The aesthetics continually changed as the mechanics and dynamics morphed. The eventual board reflected the different foodstuffs that are metabolized and were thus color-coded in concert with the Agricola disks that we used. These colors also reflected the color conventions often used in biology (fat=yellow, protein=reddish brown, glucose=black).

The event cards were initially conceived as a way for players to interact with each other, and to add an additional dimension to the game, in regards to content, mechanics, and dynamics. We found it difficult to figure out when players should be drawing cards and thus it changed into more of a global event mechanism. The events themselves were developed to introduce interesting biological concepts and also to alter the speed of the game.

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