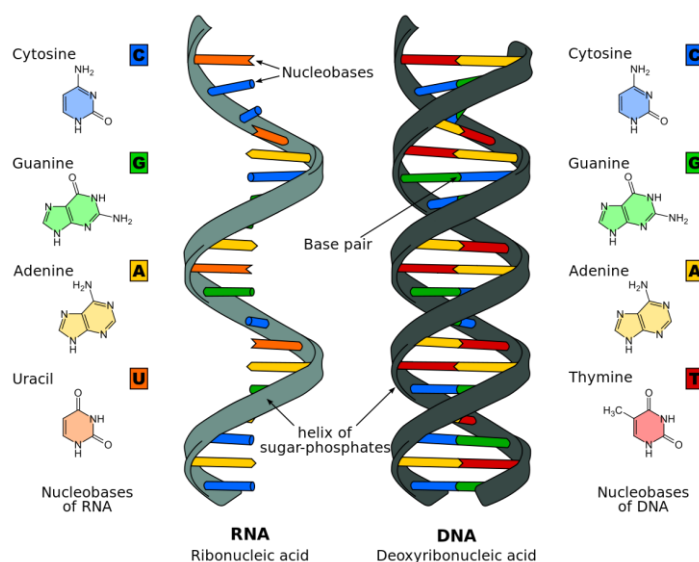


PREBIOTIC CHEMISTRY SIMULATION

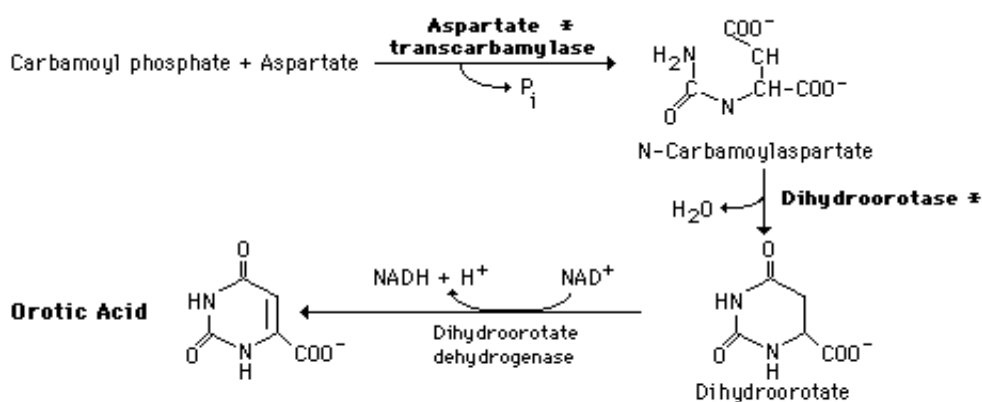
INTRODUCTION:

Data suggests that the Earth is 4.5 billion years old, and life on it is almost that old. Since hundreds of years, we try to understand what life, and how it's made. So far, in the 21st century, we cannot dissociate life from nucleic acids, their discovery led to a more complex question, how did they form, and if there is any precursor, what was it? In this simulation, I'll try to simulate the synthesis of nitrogenous bases, which are the basic components of every nucleic acid, and more specifically, the synthesis of Cytosine and Uracil, because they are the ones involved in the formation of Ribozymes.



MATERIALS AND METHODOLOGY:

The simulation is built using Slnovo.org platform. We use what we call agents, which are our molecules that will react with each other in order to give new agents. We start the simulation with 2 agents, and 3 environmental agents, which simulate temperature and the pH, these agents trace colors all over the world, so an Orange color mean: High temperature and acid...



≠ Part of the same multi-functional protein

Agents are created throughout the simulation, but others are also destroyed, either when they react, or when they last too long without reacting, they will be deleted.

CODING:

We begin the simulation with 2 agents, and we expect two resulting agents:

Aspartate reacts with carbonylphosphate, and it gives one Carbonylaspartate molecule, which would be black, and when the reaction happens, the two reacting molecules are automatically deleted.

Every reaction of the pathway is encoded this way,

Each reaction has a probability rate, and happens in specific environmental conditions (Temperature and pH), if the molecules hit each other in a different environment than hot and acid, the reaction does not happen.

Environmental conditions are simulated using agents, that are created and deleted through time, they mark the terrain with a specific color, so our molecules can detect these colors and react.

RESULTS:

The different reactions happen very fast, and the intermediates don't last too long (Either react or disappear), and we get Cytosines and Uraciles very quickly (100 seconds).

