A presentation based on the TED talk by Martin Hanczyc, London, Spring 2011:

The line between life and not-life

Slides created by

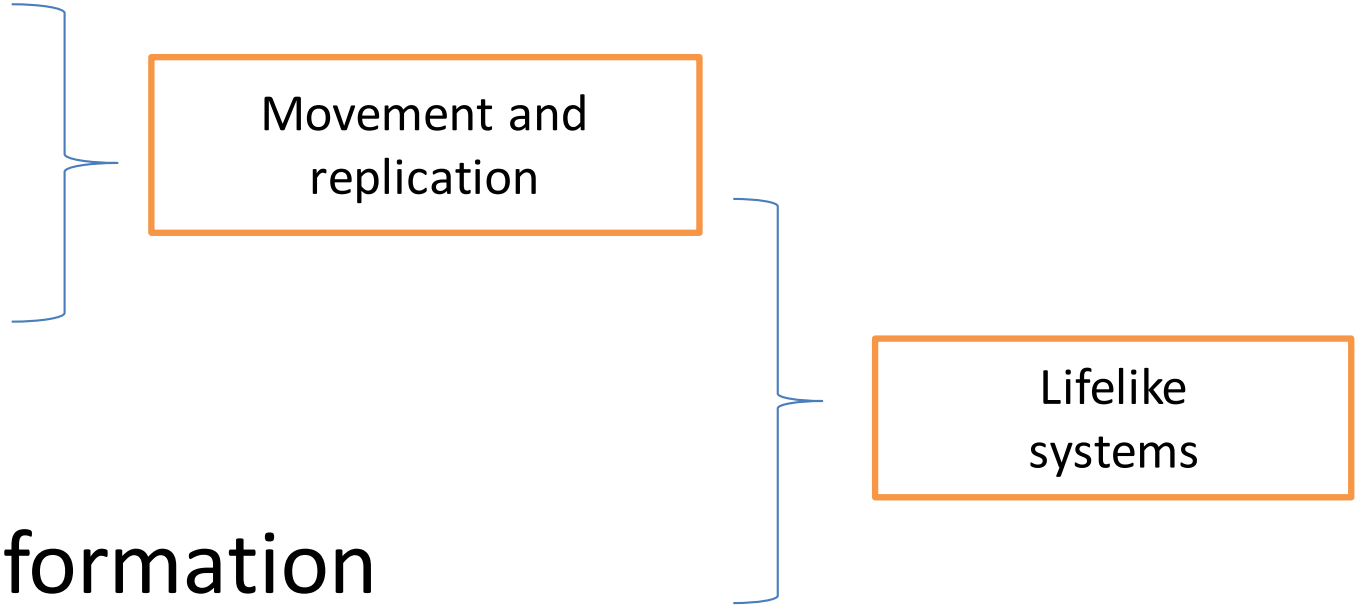
Systems

- Non- living ----------> Living

- Artificial life

Living systems characteristics

- Body
- Metabolism
- Inheritable information



Protocell

- Chemical model of living cell
- Cell: millions of different types of molecules
- Protocell : ten of different types of molecules
- Leduc : ‘‘*The synthesis of life, should it ever occur, will not be the sensational discovery which we usually associate with the idea’’*

Evolution theory

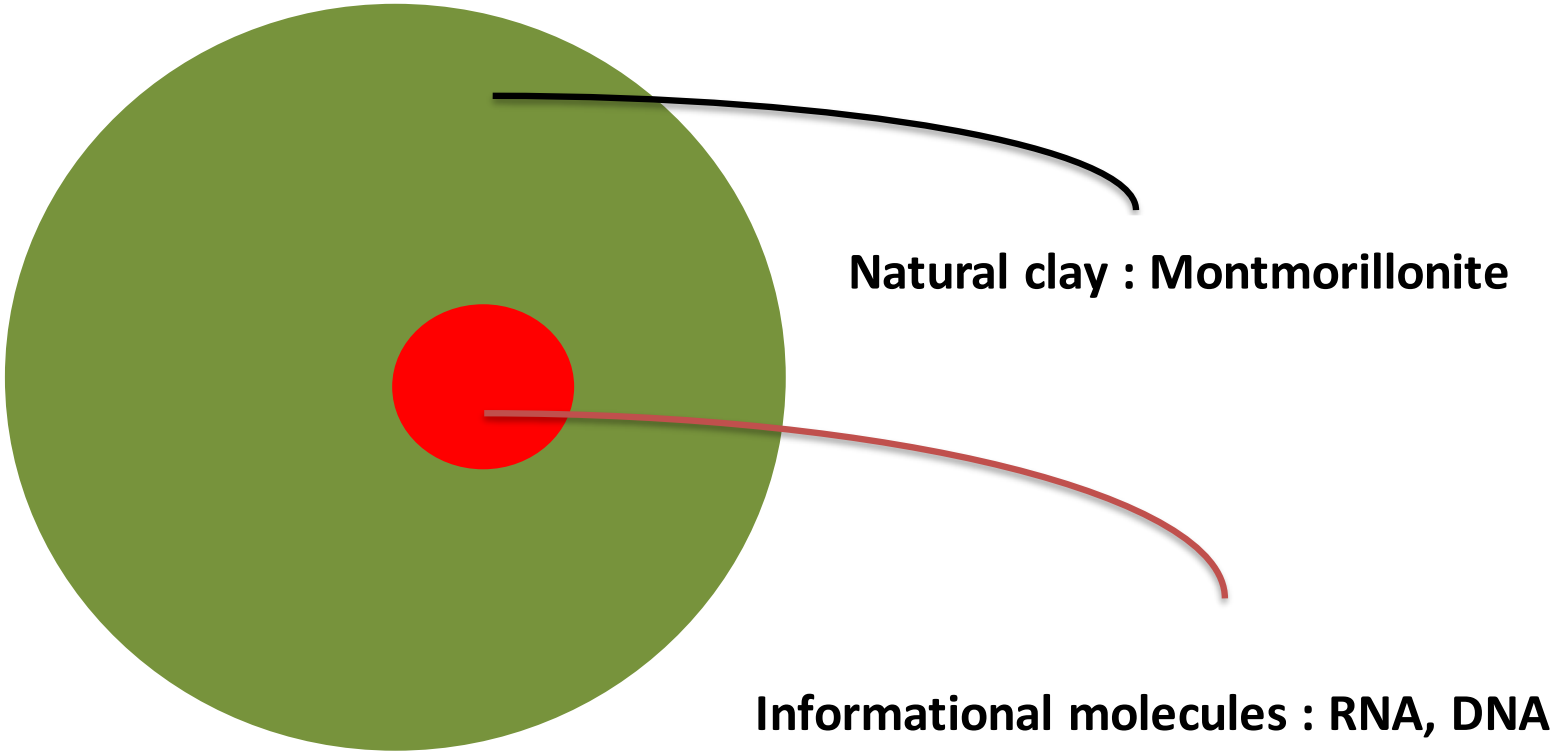
- Rudimentary attributes of life
- Enviroment

Evolution

- Self- assembly of chemicals → non existing before large stucture
- Body of protocell : membrane molecules in the right enviroment which are similar morphologically and fuctionally to our body membrane

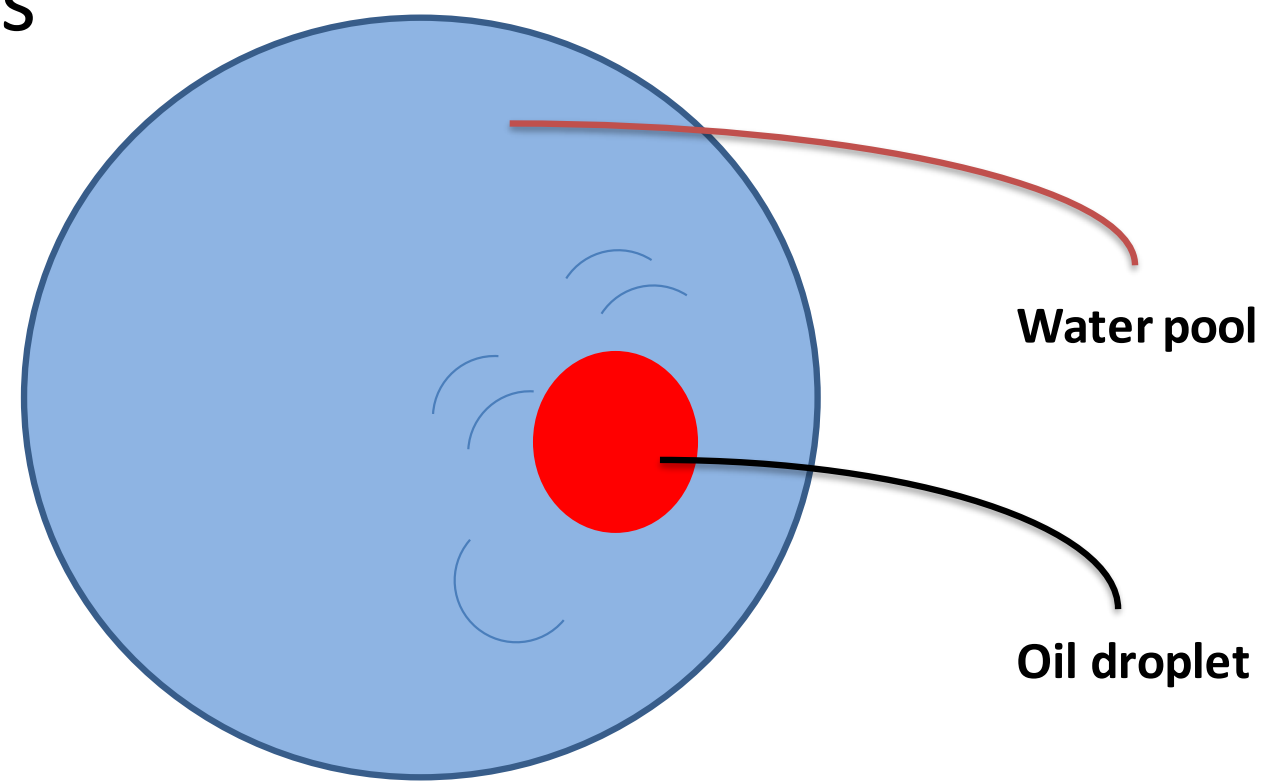
Artificial organism

- Protocell model 1 : run a metabolism on it



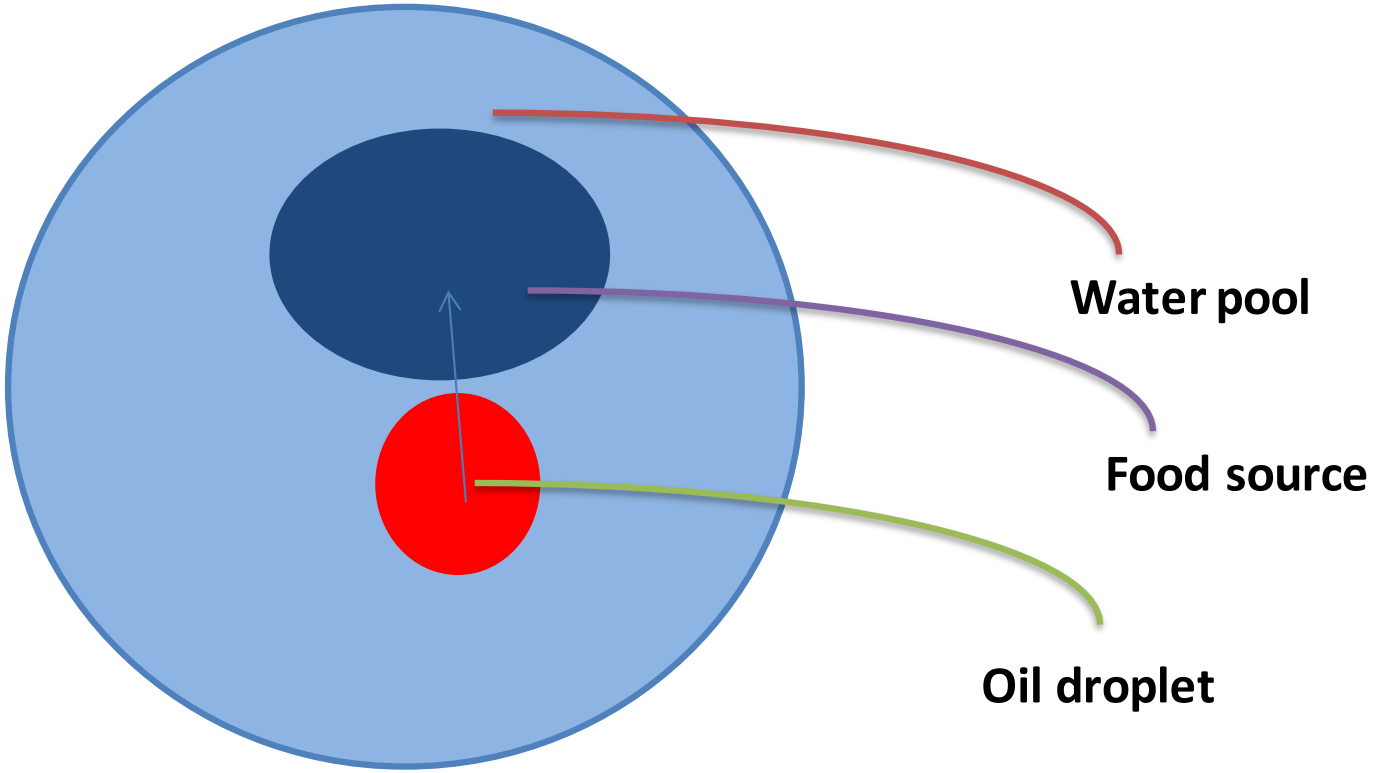
Living systems

- Dymanic system: use energy to move
- Self - assembly protocell model 2 : Oil – water systems



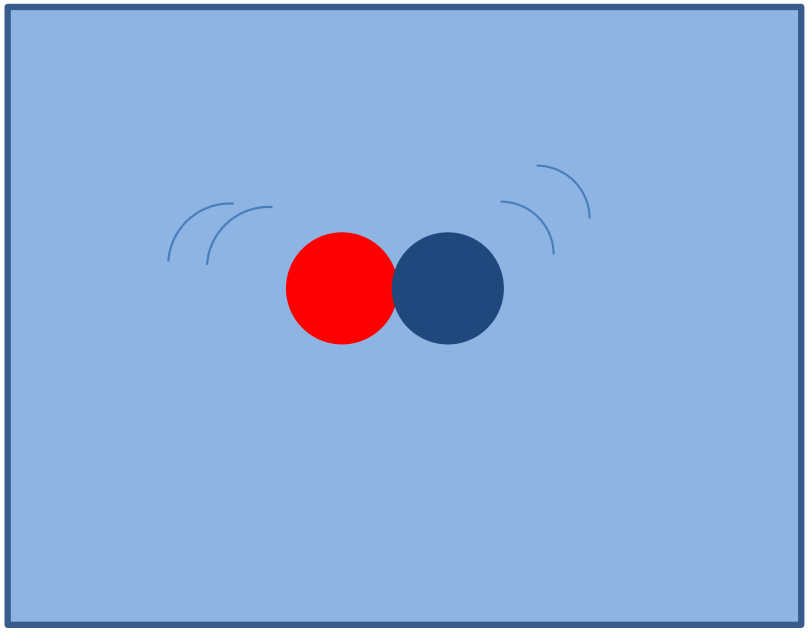
Protocell model 2

- Body, moving , metabolic protocell that sustain itself

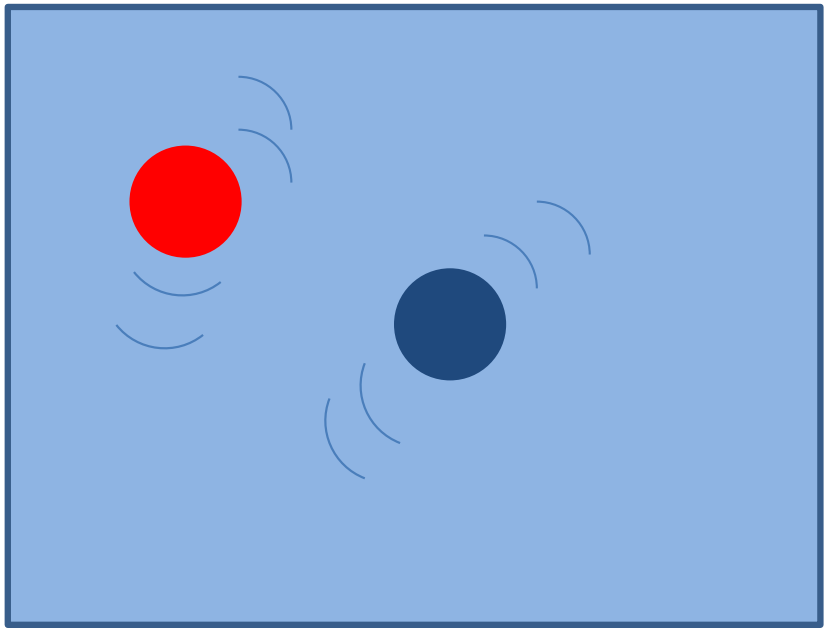


Types of interactions

- **1 moving protocell**



- **2 moving protocell**



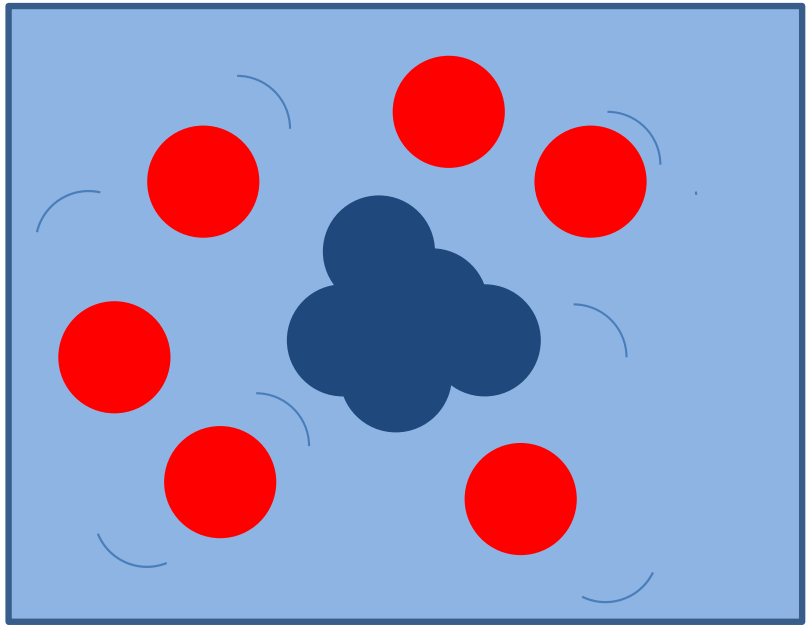
Kinds of protocell

Protocell A → Vibration

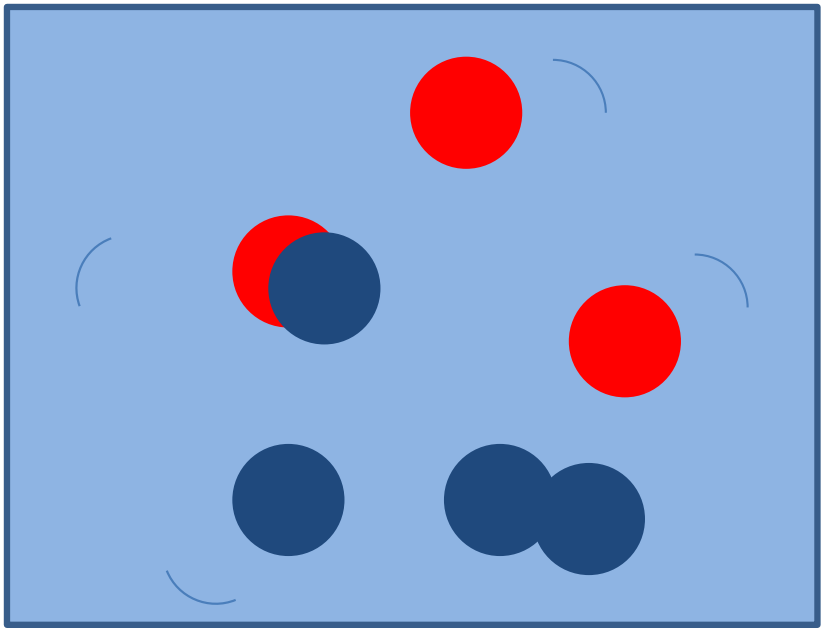
Protocell B → Fusion

Interactions of different protocells

- Protocell A + Protocell B

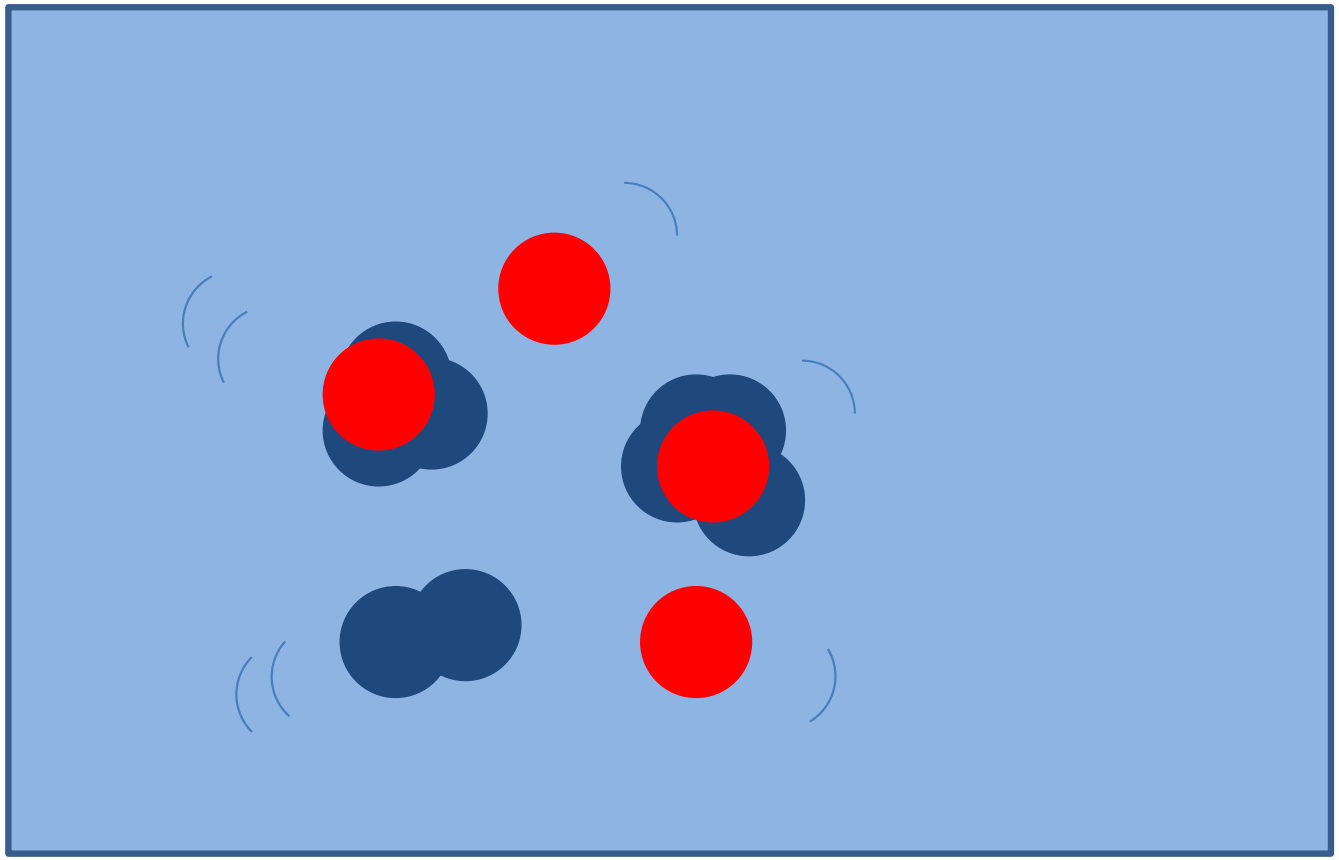


- Hybrid protocell AB



Replication

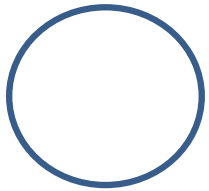
- One to two hybrid protocells

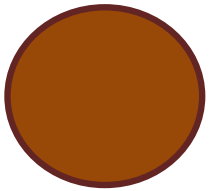


Origin of life

- Primordial ooze : mixture of diverse organic compound

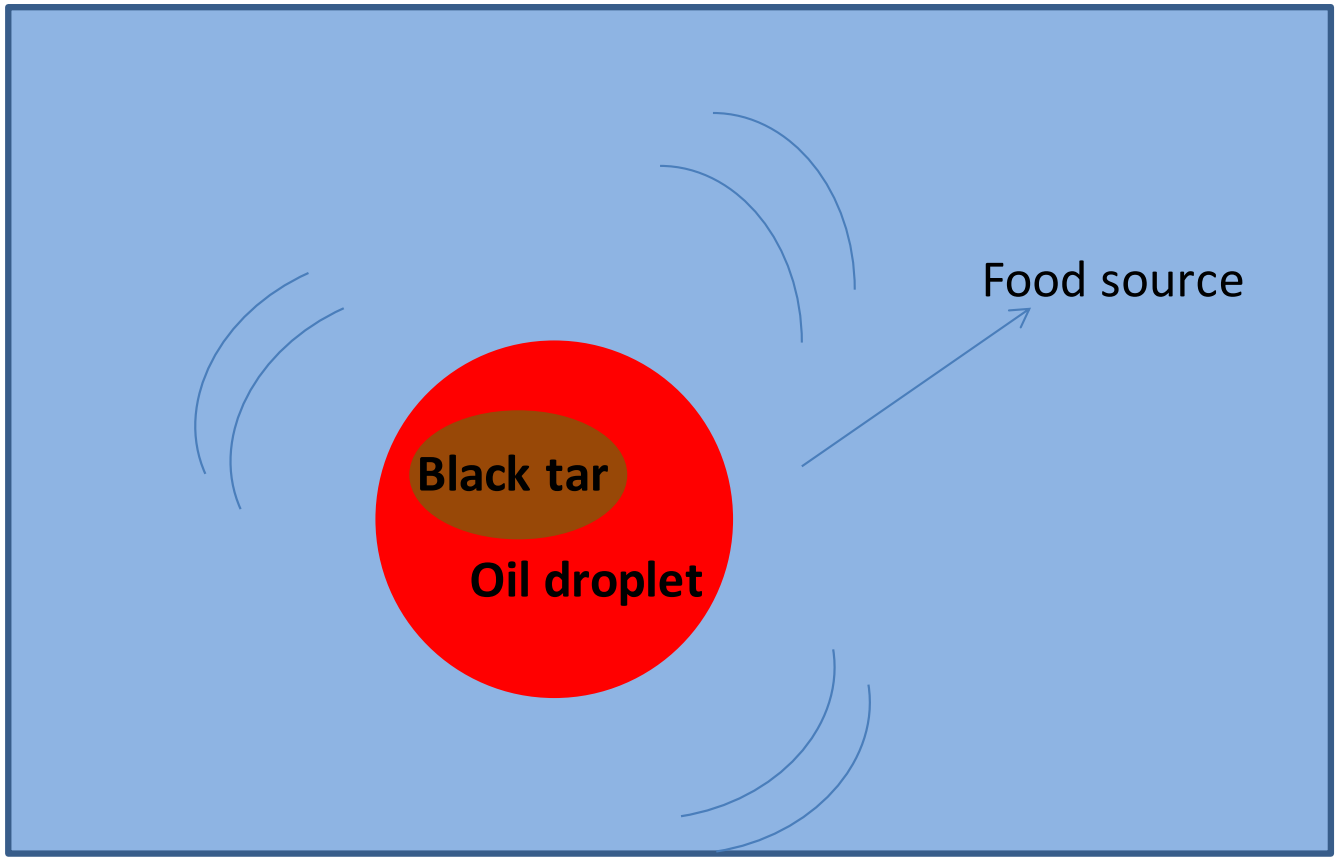
- Pure sugar crystal → brownish caramel





- 4- 4,5 bilion years ago : life out of junk and not from pure chemicals

Tar- fuelled protocell



Artificial life experiment

- Pathway between non- living and living systems

- ‘‘Weird life’’

- General criteria of systems :

➢ Non- equilibrium

➢ Liquid form

➢ Make and break chemical bonds

- Protocells with likelife properties :
  - Clay
  - Primodial ooze
  - Oil and water
  - No DNA

- Origin and existance of life

- Life out of universe