

The DNA ability to binding to another DNA molecule with different origin could be a lesson to improve our social behaviour

Abstract

The DNA molecule not discriminate between double strands extracted from diverse organisms, making possible the recombinant DNA. This probably occurs because is a fundamental molecule produced at beginning of life to support genetic information necessary to execute correctly all living process. My reflection is that this particular property of binding DNA molecules with different origin is an example that could help to modulate our social behavior, especially when immigrants and people with other racial origins has particular problems at America and Europe. DNA can regulate, control and restrict its relationship with other DNA molecules, however still allow DNA recombination. As society, we could learn from this molecular relationship, to improve our integration policy of immigrants and of people with other racial origin, especially if we look to the others as members of the same evolutionary origin.

Keywords: DNA, discrimination, recombinant, immigrants, evolution, origin of life

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In diffusion activities of the Faculty of Renewable Natural Resources of Arturo Prat University, in Chile, our subject research was shared with the community through interactive stands placed in public place like the mall. As director of Laboratory of Molecular Biotechnology, we create a stand to perform DNA isolation from cheek cells using simple and safe protocols. Thus, everyone could leave our stand with a tube that contained its own DNA purified by them. As expected, people made question, but one of the most frequently question than has taken my attention was; if the other DNA molecule (pointed to her husband, friends, daughter, etc) is the same as mine?. The answer was yes and no. Structurally are the same, but the genetic code, the sequential order of 4 letter (ATCG) is different. In fact, the DNA structure is so conserved that two DNA molecules isolated from diverse organisms can be joined by molecular techniques to express recombinant information, as demonstrated by Cohen and Boyern when they produce human insulin from a bacteria transformed with recombinant DNA.¹ On that sense, the absence of discrimination between DNA molecules obtained from different organisms made me reflect about the discrimination realized each day in many countries around the world, especially in term of "immigrants" or "racial discrimination" frequently heard at Europe and American continent. The absence of discrimination between DNA molecules, and therefore the tremendous potential of create recombinant DNA, rise the possibility of produce genetic modified organisms with all imaginable characteristics, but with a prudent path forward.² This is possible because all living organisms come from a common ancestor, a successful model conceived at the beginning of life and that has evolved adapting to all environmental challenge. Independently of the theory of the previous RNA world and still more ancient Lipidic world,³ the incorporation of DNA as molecule selected to store the genetic information, was the essential key step that sustain life on earth.

That fact involve a model where genetic information is stored carefully and repaired accurately, leaving a minor proportion for changes than eventually could be invested in evolution. The saved genetic information was used to produce a transient molecule (as RNA molecule) that express the correct information needed to synthesize a new molecule, the protein. Thus, at the origin of life the DNA is also related to the cell function and therefore, the binding to other DNA molecules became an opportunity to add new genetic traits, which could improve the surviving chances in a dynamic environment. This basic principle of binding to other DNA molecules independently of their origin conferred an enormous advantage to virus and other mobile genetic elements to cut, mix and join DNA segments, including functional genes, increasing the biodiversity between species and within species.⁴ Transposons in plants is another good example about how these mobile genetic elements could influence in cell function and phenotype of eukaryotic organisms.⁵ Therefore, considering all these aspect, I reflect; how different could be our society if everyone could have that kind of relationship with other people, independently of their origin and phenotype. How different could be our international relationship, if everyone could recognize the same evolutionary origin, the same ancestral mother or ancestral cell, and therefore in molecular terms, recognize that all of us are the same. In that context, racial discrimination is unacceptable because all have the same DNA, which come from a common ancestral DNA. How different could be our society, if we could relate between us, as done the DNA. However, this ability of accept other DNA molecules is not absent of controls and restrictions. In recombination events, at least a minimum of similarities between homologous sequences is demanded.⁶ In epigenetics, the condensation degree of chromatin regulates the genetic expression. DNA segments more relaxed are highly expressed, whilst DNA segments more condensed are repressed. The chemical modification of histones can change the condensation state of chromatin, in a process that is controlled and adjusted according to cell necessities.⁷

In that context, recombination is produced just between relaxed DNA molecules. In crossing over event during meiosis, through changes in the degree of condensation of chromatin the process is controlled. On the other hand, bacteria can defeat the phage attack because have endonucleases that can recognize and cut just the phage DNA, leaving bacterial DNA intact.⁸ In the same way, our tolerance between humans, not involve the absence of controls. Is important recognize in the other her difference, but always considering that differences enrich the environment and promote life. Is essential to have laws and regulations in our society, because orderliness triggers a pacific state that finally contribute to live a life in harmony. As DNA, also is necessary distinguishing others that can affect detrimentally our society, affecting his harmony and pacific life style. That recognition has to be carefully performed, because as the DNA, the intention is destroy just phage DNA (others that negatively affect our society), without affect plasmid DNA (the other than contribute positively to our society) that could contribute to survive in adverse conditions. Our society must be carefully to distinguish those people that affect negatively our society from those that contribute to social improvement. Social policies without this distinction could promote unfair discrimination. Therefore, to promote social integration, these policies must consider this kind of distinction and should be executed very carefully.

Conclusion

In conclusion, is interesting consider how a simple DNA molecule, made with few chemical element, could give us an important lesson about how we should behave between us. If everyone could comprehend some basic concepts about DNA, evolution and origin of life, and could incorporate it in our social abilities, perhaps our life style could be better.

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Conflict of interest

Author declares that there is no conflict of interest.

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