

INSTITUTO DE INVESTIGACIONES FILOSOFICAS
FACULTAD DE FILOSOFIA Y LETRAS
U.N.A.M.

Curso de Maestria

BIOLOGÍA Y COGNICION

2020-2

Dra. Claudia Lorena García

DESCRIPCION DEL CURSO

Varios investigadores en las ciencias cognitivas y en la biología piensan una forma de trazar la filogenia de las capacidades cognitivas en los animales (incluyendo el humano) es usando algunas de las herramientas que se usan en la biología evolutiva: a saber, la cladística.

Objetivo general: Explorar algunos de los conceptos centrales involucrados en las discusiones acerca de la evolución biológica y la filogenia, y sus interconexiones

REQUISITOS DEL CURSO

(1) Una presentación en equipo de los alumnos sobre alguno de los temas a tratar.

TEMAS DEL CURSO

1. HOMOLOGÍA MORFOLÓGICA: DEBATES.

Examinaremos los conceptos básicos que están involucrados en el concepto de homología morfológica, y los problemas que existen para construir un consenso entre los biólogos acerca de cómo entender este concepto central para hablar de la filogenia de los diferentes rasgos de los organismos biológicos.

de Pinna, Mario G. G. (1991), "Concepts and Tests of Homology in the Cladistic Paradigm" *Cladistics* 7: 367-394.

Striedter, Georg F. and R. Glenn Northcutt (1991), "Biological Hierarchies and the Concept of Homology" *Brain, Behavior and Evolution* 38: 177-189.

Wagner, Gunther (1989), "The Biological Concept of Homology" *Annual Review of Ecology and Systematics* 20: 51-69.

Müller, Gerd (2003), "Homology: The Evolution of Morphological Organization". In: Gerd B. Muller and Stuart A. Newman (eds.), *The Origination of Organismal Form: Beyond the Gene in Developmental and Evolutionary Biology*. (Cambridge, Massachusetts: The MIT Press), pp. 51-69.

Ereshefsky, M. (2009). Homology: Integrating Phylogeny and Development. *Biological Theory*, 4, 224-229. doi: 10.1007/s10539-012-9313-7

Butler, Ann y William M. Saidel, (2000), "Defining Sameness: Historical, Biological, and Generative Homology" *BioEssays* Vol. 22, pp. 846-853.

2. HOMOLOGÍA EN LA BIOLOGÍA DEL DESARROLLO.

Revisaremos la propuesta de Abouheif de definir un concepto de homología que sea aplicable a redes genéticas regulatorias.

Abouheif, E. (1999). Establishing Homology Criteria for Regulatory Gene Networks: Prospects and Challenges. In *Homology* (pp. 207-225). Chichester: Wiley (Novartis Foundation Symposium 222). books.google.es/books?isbn=047051566X

Davidson, E.H. y D.H. Erwin (2006), "Gene Regulatory Networks and the Evolution of Animal Body Plans", *Science* 311: 796-800.

3. PARALELISMO, CONVERGENCIA Y HOMOLOGIA PROFUNDA EN LA BIOLOGÍA EVOLUTIVA

Examinaremos la estructura de otros conceptos intimamente relacionados al concepto de homología.

Arendt, J. y D. Reznick (2007), "Convergence and Parallelism Reconsidered: What Have We Learned About the Genetics of Adaptation?", *Trends in Ecology and Evolution* 23: 26-32.

Erwin, D.H. y E.H. Davidson (2009), "The Evolution of Hierarchical Gene Regulatory Networks", *Nature Reviews Genetics* 10: 141-148.

- Galis, F. y J.A. Metz (2001), "Testing the Vulnerability of the Phylotypic Stage: On Modularity and Evolutionary Conservation", *Journal of Experimental Zoology/Molecular Developmental Evolution* 291: 195-204.
- Hall, B.K. (2003), "Descent with Modification: The Unity Underlying Homology and Homoplasy as Seen Through an Analysis of Development and Evolution", *Biological Review* 78: 409-433.
- Hall, B.K. (2007), "Homoplasy and Homology: Dichotomy or Continuum?", *Journal of Human Evolution* 52: 473-479.
- Irie, N. y S. Kuratani (2011), "Comparative Transcriptome Analysis Reveals Vertebrate Phylotypic Period During Organogenesis", *Nature Communications* 2: 248.
- Kalinka, A. T., Varga, K.M., Gerrard, D.T., Preibisch, S., Corcoran, D.L., Jarrells, J., Ohler, U., Bergman, C.M. y P. Tomancak (2010), "Gene Expression Divergence Recapitulates the Developmental Hourglass Model", *Nature* 468: 811-814.
- Leander, B.S. (2008), "Different Modes of Convergent Evolution Reflect Phylogenetic Distances: A Reply to Arendt and Reznick", *Trends in Ecology and Evolution* 23: 481-482.
- Ochoa, C. y D. Rasskin-Gutman (2015), "Evo-devo Mechanisms Underlying the Continuum between Homology and Homoplasy", *Journal of Experimental Zoology/ Molecular Developmental Evolution* 324B: 91-103.
- Piasecka, B., Lichocki, P., Moretti, S., Bergmann, S. y M. Robinson-Rechavi (2013), "The Hourglass and the Early Conservation Models-Co-Existing Patterns of Developmental Constraints in Vertebrates", *PLoS Genetics* 9(4): e1003476.
- Powell, R. (2012), "Convergent Evolution and the Limits of Natural Selection", *European Journal for the Philosophy of Science* 2: 355-373.
- Scotland, R. (2011), "What is Parallelism?", *Evolution and Development* 13: 214-227.
- Shubin, N., Cliff, T. y S. Carroll (2009), "Deep Homology and the Origins of Evolutionary Novelty", *Nature* 457: 818-823.
- Sommer, R.J. (2008), "Homology and the Hierarchy of Biological Systems", *BioEssays* 30: 653-658.

Wake, D.B., Wake, M.H. y C.D. Specht (2011), "Homoplasy: From Detecting Pattern to Determining Process and Mechanism of Evolution", *Science* 331: 1032-1035.

Waters, C.K. (2007), "Causes that Make a Difference", *Journal of Philosophy* 104: 551-579.

Wimsatt, W.C. (1986), "Developmental Constraints, Generative Entrenchment and the Innate-Acquired Distinction", en Bechtel, W. (ed.), *Integrating Scientific Disciplines*, Dordrecht: Martinus Nijhoff, pp. 185-208.

García, C. L. (2017) "Paralelismo, convergencia y homología profunda en la biología" *Metatheoria*

4. LA NOCION DE NIVELES DE ORGANIZACIÓN BIOLÓGICA

Aquí examinaremos la idea muy difundida en muchas de las disciplinas biológicas que existen niveles de organización biológica, por ejemplo, el nivel molecular (genético), el de las redes genéticas regulatorias, el nivel del desarrollo, el morfológico, el nivel de la conducta, etc. ¿Puede esta idea ser construida o entendida de una manera interesante y coherente, o es solo una metáfora quizás útil?

Abouheif, E., 1997, "Developmental Genetics and Homology: A Hierarchical Approach", *TREE*, Vol. 12, pp. 405-408.

Aizawa, K., and Gillett, C., 2009, "The (Multiple) Realization of Psychological and other Properties in the Sciences", *Mind and Language*, Vol. 24, pp. 181-208.

Craver,

Eronen, M., 2015, "Levels of Organization: A Deflationary Account", *Biology and Philosophy*, Vol. 30, pp. 39-58.

Figdor, C., 2018, "Neuroscience and the Multiple Realization of Cognitive Functions", *Philosophy of Science*, Vol. 77, pp. 419-456.

Hall, B. K., 2003, "Descent with Modification: The Unity Underlying Homology and Homoplasy As Seen Through an Analysis of Development and Evolution", *Biological Review*, vol. 78, pp. 409-433.

Korn, R. W., 2002, "Biological Hierarchies: Their Birth, Death and Evolution by Natural Selection", *Biology and Philosophy*, Vol. 17, pp. 199-221.

Sommer, R. J., 2008, "Homology and the Hierarchy of Biological Systems", *Bio-Essays*, Vol. 30, pp. 653-658.

Wimsatt, W., 1994/2007, "The Ontology of Complex Systems: Levels of Organization, Perspectives, and Causal Thickets", *Canadian Journal of Philosophy*, Vol. 20, pp. 207-274.

García C. L. (manuscrito), "The idea of levels of biological organization and its relationship to some mechanistic notions".