Developmental Biology in Ibero-America

Guest Editors

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Preface

A display of Developmental Biology in Ibero-America

The title of this Special Issue, *"Developmental Biology in Ibero-America"*, refers to the progress in developmental biology occurring in the American countries that speak Portuguese and Spanish. A volume about developmental biology in Portugal and Spain was published by *The International Journal of Developmental Biology* with the title "Developmental Biology in Hispania" (Aréchaga, 2009). *"Hispania"* was the name given by the Romans to the Iberian Peninsula, i.e., the present–day countries of Portugal and Spain (Aréchaga, 2009). For this reason, Juan Aréchaga, the *Int. J. Dev. Biol.* Editor-in-Chief, suggested that developmental biology be surveyed in the countries of the Americas in which Portuguese and Spanish are spoken. Consequently, we named this issue *"Developmental Biology in Ibero-America"*, indicating the relationship of its countries to those of the Iberian Peninsula.

This Special Issue provides a perspective of developmental biology in the region, with articles written by invitation. The editorial work was divided as follows: Nora B. Calcaterra and Miguel L. Concha handled the manuscripts from Argentina, Chile and Uruguay. Diana Escalante-Alcalde and Jesús Chimal-Monroy were in charge of manuscripts from Brazil and Mexico. José E. García-Arrarás oversaw the contributions from Colombia, Ecuador, Panama and Puerto Rico. Eugenia M. del Pino gave structure to this Special Issue, and oversaw its advancement. The research reported was conducted in Ibero-American countries. However, some articles included cooperation with researchers working in other parts of the world. For the most part, we invited articles from investigators not represented in the special issues dedicated to Latin America by other journals: *Developmental Dynamics* (volume 241 issue 12, 2012), Journal of Experimental Zoology - Part B: Molecular and Developmental Evolution (volume 328 issues 1–2, 2017), and Mechanisms of Development (volume 144, 2017 and volume 154, 2018).

The immensity and mysteriousness of "The Americas" is evoked in Symphony No. 9 in E Minor, Op. 95 "From the New World", by Antonín Dvořák (1893). Dvořák was inspired by the wide open spaces of North America (https://www.britannica.com/topic/New-World-Symphony; retrieved 2019-12-07). Similarly immense is Ibero-America, an enormous region that includes Mexico, the Caribbean, Central America and the large continent of South America. Size comparisons aid in understanding the large dimensions; thus, for example, Argentina and India are of similar size. Similarly, Brazil and The United States of America are of about the same size.

More impressive than size is the magnitude of the Ibero-American influence on biological thought through the work of several European naturalists. I will only mention three of them, Alexander von Humboldt, Charles Darwin, and Alfred Russel Wallace. The journey of Alexander von Humboldt to the Americas influenced his thinking. He contributed to the understanding of physical geography and biogeography, now included in the sciences of ecology and earth sciences (https://www.britannica.com/biography/Alexander-von-Humboldt; retrieved 2019-12-17). Charles Darwin and Alfred Russel Wallace travelled in this region. Darwin and Wallace independently discovered natural selection and its significance for biological evolution (Kutschera, 2008).

The contributions of Ibero-America to EvoDevo are recent (Marcellini *et al.*, 2017). However, if science had arisen in Ibero-America, we might have had different biological paradigms. For example, frogs might not have even been called amphibians, as many Ibero-American frogs do not lay aquatic eggs or have tadpoles living in water (Elinson R.P., 2021, this issue). The Ibero-American animals that have contributed the most to research on embryonic development are probably the marsupial frog, *Gastrotheca riobambae*, and the direct developing frog, *Eleutherodactylus coqui* (articles by del Pino (2021) and Elinson (2021), this issue). The extraordinary biodiversity of Ibero-America is a treasure for the analysis of embryonic development and the permissible deviations allowed during evolution.

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Ibero-America is a region of high cultural standards, as evidenced by the Ibero-American writers and scientists that were awarded The Nobel Prize. Gabriela Mistral (Chile, 1945), Miguel Ángel Asturias (Guatemala, 1967), Pablo Neruda (Chile, 1971), Octavio Paz (Mexico, 1990), Gabriel García Márquez (Colombia, 1982), and Mario Vargas Llosa (Peru/Spain, 2010) received the Nobel Prize for Literature. The Nobel Prizes for Physiology or Medicine were awarded to Bernardo A. Houssay (Argentina, 1947), Baruj Benacerraf (Venezuela/USA, 1980), and César Milstein (Argentina/United Kingdom, 1984). The Nobel Prizes for Chemistry were awarded to Luis F. Leloir (Argentina, 1970) and Mario J. Molina (Mexico, 1995) (https://www.nobelprize.org/prizes/ ; retrieved 2019-12-07).

Scientific advancement varies greatly among Ibero-American countries. For example, the high scientific level of Argentina is evidenced by the several Nobel Prizes awarded to Argentinian scientists. Additionally, Argentina, Mexico and Brasil account for 15% of the total membership of the World Academy of Sciences for the Advancement of Science in Developing Countries (TWAS), an indication of the high scientific level of these countries (https://twas.org/sites/default/files/directory_pdf/fellows_residence.pdf; retrieved 2019-12-05). On the other hand there are countries in Ibero-America with low research capacity. TWAS identified El Salvador, Guatemala, Honduras, Nicaragua, Bolivia and Paraguay as countries significantly lagging in science and technology due to their low income levels (https://twas.org/66-countries; retrieved 2019-12-05). A future task will be to enhance the research capacities of these countries through national and international efforts.

As it is traditional in the *Int. J. Dev. Biol.* Special Issues dedicated to different countries, this issue includes interviews with scientists that live in Ibero-America and abroad. Moreover, an imaginary interview with the direct-developing frog *Eleutherodactylus coqui* from Puerto Rico highlights the importance of this frog for the field of developmental biology (Elinson R.P., 2021) (this issue). The issue has a selection of historical reviews, and highlights the importance of the Latin American Society for Developmental Biology (LASDB) and of the International Courses of Developmental Biology. This Special Issue provides perspectives, and signals the current advances of developmental biology in Ibero-America.

The success of this showcase of developmental biology in Ibero-America is the result of important cooperation. In the first place, the Co-Editors provided enthusiastic collaboration. Moreover, the invited authors responded to our invitation to document the advances of developmental biology in Ibero-America. Finally, anonymous colleagues reviewed the plethora of articles of this issue. To all of them, I express sincere thanks.

Eugenia M. del Pino
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