

## Exploring the Frontiers of Serotoninomics in Male Reproduction: The Future Ahead

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### Letter to the Editor

Since its discovery in the past century by Green, Page and Rapport (1948), to the present time, several physiological actions of serotonin has been discovered. Besides physiological functions, several components of serotonergic system and its participation in some neurological diseases (i.e. depression, schizophrenia) also have been reported. During previous decades, a lot of experimental techniques have allowed us to locate, detect, analyze and describe the serotonergic system and its role in different organs and tissues; at the time of 60's and 70's of century XX, techniques such as histochemistry for indolamines or Falck-Hillarp method, fluorescence microscopy and the realization of measurements of concentrations in tissues or blood using chromatography enabled significant progress in the study of this indolamine; then, in 80's and 90's, was the use of immunohistochemistry with specific antibodies, chromatography of high resolution and the use of transgenic animal models, and in recent decades the boom in both genomics and proteomics has made possible to refine knowledge about the role of serotonin in several biological models. Furthermore, the importance of this indolamine has driven to the creation of the International Society for Serotonin Research in 1987 (<http://www.serotoninclub.org>), an organization devoted to document, register and classify the identification of receptors, drugs or compounds related to the serotonergic system. Altogether, this data emphasize the importance that this indolamine have in living organisms, ranging from plants, invertebrates, and all vertebrates inhabiting our planet. Future directions in the study of serotonin for the next years must be focused at the description of its action at different levels of structure and function of organs and tissues or whole organisms; using novel in vivo and in situ techniques which let us to approach to a more physiological condition.

On the other hand, the current and fashionable terminus “omics” everything that generalize a single topic or concept (metabolomics, genomics, proteomics, nutrigenomics, pharmacogenomics, etc), should be valid to call “serotoninomics” to the whole studies realized about serotonin, including experimental techniques and laboratory tools both current and past used intensely in the last century.

With this background, we want to stand out the role of serotonin in mammalian reproduction that was started to be a matter of research since the decade of 60's of the last century mainly studying the effect of this indolamine in the sexual behavior of males. Of relevant importance is to know that serotonin participates in several reproductive processes, i.e. serotonin could regulate the inhibition of androgen production through an AMPc-dependent pathway autocrine in Leydig cells, or could promote the sperm maturation and probably the fertilization processes. It is well documented the role of serotonin in some reproductive diseases such as varicocele, infertility and abnormal sexual behavior, all of which are topics that must be explored thoroughly in the following years. The vision for the field of study of serotonin in biological processes is so broad that it will take us generations of researchers for further amplifying the physiological meaning and pathologies in which serotonin is involved, in addition to female infertility, andrology, embryology, animal biotechnology, stem cell biology, transplant technology or regenerative medicine, biomarkers for diagnosis of diseases, molecular pharmacology, among other activities.

Finally, we consider that genomic and proteomic analysis related to serotoninomics will contribute to answer some of the key questions that remain open in the field of scientific research.

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