Editorial: Women in experimental pharmacology and drug discovery: 2021

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Women are still underrepresented in research worldwide. Thus, it is crucial to encourage young women to decide for a career in science. There are many obstacles on the scientific path of a woman, and many women still describe reaching the glass ceiling whilst attempting to follow their aspirations. As female researchers working in the fields of pharmacology/biochemistry and as principal investigators leading groups that include mainly women, we have gathered experience in all aspects of research life. We thus gladly accepted the invitation to serve as guest editors of a Research Topic dedicated to promoting research by female scientists across all fields of Experimental Pharmacology and Drug Discovery, with an emphasis on submissions with women as first and/or corresponding authors.

This Research Topic includes contributions from four young female researchers from China, Pakistan, Austria, and Hungary. Their research highlights the diverse fields of Pharmacology. By chance, the submitted research mainly focuses on molecular aspects of conditions and pathologies that mainly affect women in their reproductive and post-reproductive periods. These include premature ovarian failure (POF), osteoporosis, and high-grade serous ovarian cancer (HGSOC), but also more general aspects regarding transporters responsible for the uptake of steroid precursors, prostaglandins, vasopressin, thyroxine, and different drugs in the brain and testes.

Zhang et al. investigated the role of oxidative stress and possible protective signaling pathways in POF. POF affects 1–3% of women, and its risk factors are heterogeneous and include oxidative damage. Currently, the only available chemical treatment for these patients is hormone therapy; however, this can increase the risk of gynecological cancers and other diseases. Zhang et al. studied the role of nuclear factor erythroid-2 related factor 2 (Nrf2), a transcription factor that regulates cellular responses to oxidative stress in a chemically induced POF mouse model. They demonstrated that Nrf2 knock-out mice are more susceptible to POF. They also showed that daphnetin, a Chinese herbal medicine and known activator of NRF2 signaling, plays a protective role in this chemically induced POF.
One such member is OATP3A1, which is most abundantly expressed in the human brain and testes, where it can influence drug absorption, distribution, and elimination. These drug transporters, including OATP1A2, OATP1B1, OATP1B3, and OATP2B1, have been extensively investigated. However, other members of the OATP family are significantly less well-studied. One such member is OATP3A1, which is most abundantly expressed in the human brain and testes, where it can potentially mediate steroid hormone uptake. Bakos et al. cloned a novel functional isoform of OATP3A1 (OATP3A1_V3) and demonstrated that it shared substrates with the other two previously known OATP3A1 isoforms (OATP3A1_V1 and OATP3A1_V2). However, the novel variant localizes to the opposite (apical) membrane of the choroid plexus than OATP3A1_V1. The distinct localization of OATP3A1 isoforms in the choroid plexus may ensure the movement of steroid hormones from the blood to the central nervous system.

In HGSOC, OATP4A1 expression was connected to mitochondrial dysfunction but not estrogen-associated pathways. Based on these results, the major role of OATP4A1 in HGSOC may involve prostaglandin E2 uptake. Furthermore, high SLCO4A1 expression was connected to inflammation-associated pathways, and low SLCO4A1 expression to mitochondrial dysfunction but not estrogen-associated pathways. Based on these results, the major role of OATP4A1 in HGSOC may involve prostaglandin E2 uptake.

Besides their role in the cellular uptake of endobiotics, several members of the OATP family also transport drugs and can influence drug absorption, distribution, and elimination. These drug transporters, including OATP1A2, OATP1B1, OATP1B3, and OATP2B1, have been extensively investigated. However, other members of the OATP family are significantly less well-studied. One such member is OATP3A1, which is most abundantly expressed in the human brain and testes, where it can potentially mediate steroid hormone uptake.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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