

Editorial

## Plant products impairing fertility of animals



Fertility is possibly the most important capability contained within living cells or species. Therefore, finding the most efficacious way to enhance or promote fertility is the main goal of all living things. To best manage nature's strong predisposition for fertility, plant-based traditional medicines for birth control have long been incorporated into medical practices throughout the world, including those in the rural populations of North-East India, China, and Africa.<sup>1–3</sup>

In this issue of the *Journal of the Chinese Medical Association*, Muhammad and Muhammad<sup>1</sup> published a very interesting review article entitled “Anti-fertility activity of medicinal plants,” introducing >60 species of plants that might possess antifertility activity. This article divided these antifertility plants into five categories, namely, plants exhibiting antiovulation activity, anti-implantation activity, anti-spermatogenic activity, antifertility activity by interfering with the action of hormones, and finally abortifacient activity. The authors claimed to have provided a comprehensive summary of medicinal plants from the literature, including results from Cochrane Central Register of Controlled Trials (CENTRAL), Embase, and PubMed searches using terms such as antifertility, anti-implantation, antiovulation, and anti-spermatogenic activity of plants. We applaud the authors on the success of this article, because their research and information-gathering task were not easy. However, given the size of the project that they undertook, it goes without saying that their review ultimately will omit certain important data. For example, information about the extract of *Drynaria quercifolia* (L.) J. Smith rhizome was missed in their review. This extract was proven to possess significant antifertility activity, not only showing a high efficacy for both abortifacient and anti-implantation activities, but also affecting sex-hormone release.<sup>2</sup> In addition, the presence of an “adjuvant reagent,” including that in solutions or solvents, could influence the final effect of antifertility activity of these medicinal plants. As noted earlier, the methanol extract of *D. quercifolia* (L.) J. Smith rhizome has shown higher efficacy for both abortifacient ( $p < 0.01$ ) and anti-implantation performance ( $p < 0.01$ ) than its aqueous extract dose.<sup>2</sup>

Furthermore, the effect of plant-derived products on antifertility may be dose dependent, reversible, and sex dependent. For example, Shaik and colleagues<sup>4</sup> demonstrated the antifertility potential of methanolic leaf extract of *Artemisia vulgaris*, which showed a strong and significant decrease in implant formation

(50% and 100%) at two dose levels, 300 mg/kg and 600 mg/kg, respectively. However, it also manifested a strong estrogenic effect resulting in a significant increase in uterine weight in immature ovariectomized rats.<sup>4</sup> By contrast, although Solomon and coworkers<sup>5</sup> showed that the methanolic root extract of *Rumex steudelii* could cause atrophic changes in the uterus and disruption of ovarian folliculogenesis by inhibiting further development of the recruited ovarian follicles, there was no effect in male albino rats. Dhanapal and coworkers<sup>6</sup> showed the reversible effect of *Encostemma axillare* leaves and *Urena lobata* root on inhibiting spermatogenesis and steroidogenesis, however, this effect appeared to have no significance in female Wistar albino rats.

Once again, although we commend the publication of this review article, we also conducted an extensive literature review up to December 25, 2014, to investigate the relationship between fertility and plants using the following strategies to identify the publications addressing fertility and plants. The term “decrease, fertility and plants” was used to search PubMed (<http://www.ncbi.nlm.nih.gov/pubmed/?term=anti-fertility%2C+plants>), and the term “increase, fertility and plants” in place of the term “decrease, fertility and plants” was used to access relevant articles (<http://www.ncbi.nlm.nih.gov/pubmed/?term=increase%2C+fertility%2C+plants>). This search criteria identified 266 and 574 published articles, respectively, suggesting that many natural products, especially plants, are still promising targets to be investigated not only for fertility control but also for infertility treatment. This expansive approach is also highly recommended for other troublesome diseases, such as many chronic or aging diseases, including neoplasms, diabetes mellitus, hypertension, and similar maladies. Indeed, paclitaxel, one of the most famous antineoplastic agents extracted from plants, is now widely used in the management of various kinds of neoplastic diseases, including ovarian cancer and breast cancer.<sup>7,8</sup>

### Conflicts of interest

The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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