

The first six articles of this issue of *Folia Histochemica et Cytobiologica* present invited reviews and original papers presented at the XLIXth Symposium of the Polish Society for Histochemistry and Cytochemistry, 9–12 September 2015, Miedzyzdroje, Poland. The main topic of this meeting were the applications of microscopic and molecular techniques in biological and medical research. The scientific programme offered interdisciplinary platform for specialists to encourage discussion about the latest achievements in experimental and clinical studies, including physiology and pathology of the male and female reproductive systems, to develop innovative diagnostic and treatment methods.

The comprehensive review by Ewa Rajpert-De Meyts et al. — based on the key-note lecture — describes the novel diagnostic markers of germ cell tumours (GCTs, a group of neoplasms known by its phenotypic heterogeneity), especially the most common testicular TGCTs (seminoma and nonseminoma, derived from a pre-invasive germ cell neoplasia *in situ* — GCNIS). Since the classification and histopathological diagnosis of GCTs is difficult due to their morphological differentiation, the search for molecular markers at the level of cells, tissues and organs plays a key role in the proper diagnosis. In this article, the authors who have made significant contributions to the histopathogenesis of GTCs, summarise research developments concerning histogenesis of different types of GCTs, provide contemporary review of immunohistochemical (e.g. PLAP, OCT4, NANOG, AP-2 γ , LIN28) and serum (e.g. β -hCG, AFP, LDH) markers of GCTs. Moreover, the authors point out the characteristic miRNA profiles in GCTs and tests targeting these specific miRNAs which are currently under development. In summary, the combination of morphological and molecular findings may be of considerable predictive value regarding specific diagnosis of various subtypes of GCTs and proper therapeutic approach.

The concise review by Bogacka et al. reveals the presence and significance of peroxisome proliferator-activated receptors (PPARs) — a ligand-dependent nuclear receptor family — in the female

reproductive system. The authors discuss current findings concerning the important role of PPARs in the regulation of reproductive functions at the level of hypothalamic-pituitary axis during different physiological states (oestrous/menstrual cycle and pregnancy). Moreover, the role of PPARs in the modulation of various ovarian (cells proliferation, tissue remodelling, steroidogenesis), uterine (regulation of prostaglandins, steroids and cytokines synthesis) and placental functions (trophoblast differentiation, maturation and invasion) as well as in the embryonic development has been highlighted. Furthermore, Bogacka et al. underline that certain PPAR ligands are used clinically to improve reproductive disorders while a precise understanding of their action at the level of various reproductive organs should be a significant target of future research.

The influence of microorganisms on sperm parameters and fertilizing potential is controversial and possible pathomechanism has not been finally elucidated. The invasion of the male reproductive tract by microorganisms and its consequences for male fertility were discussed in a review by Fraczek and Kurpisz. The authors, known for achievement in the field of unconventional seminological diagnosis, identification and role of inflammatory markers in the semen (bacteria, cytokines, leukocytes, reactive oxygen species), summarise the current knowledge of the main pathophysiological concepts describing the harmful effects of bacterial semen infection on sperm cells. The clinical and experimental data present in the paper provide evidence that bacteria and leukocytes in *in vitro* and *in vivo* conditions may directly and indirectly affect sperm immobilization and agglutination, sperm morphological disorders and motility, and facilitate oxidative, apoptotic and immune processes, consequently leading to reduced sperm ability to fertilization and extensive sperm elimination.

The original paper by Slowikowska-Hilczer et al. refers to the risk of neoplasm in human dysgenetic testes and provides important data for proper diagnostic and therapeutic treatment. Based on the analysis of clinical data of 94 subjects with disorders

of sex development, Y-chromosome and gonadal dysgenesis, it has been shown that dysgenetic gonads in patients with Y chromosome have a high risk of germ cell neoplasia. The authors especially underline that preserved gonads until puberty/early adulthood may develop overt, invasive GCT. On the other hand, a decision to remove the gonad or not depends on the phenotype of a patient and should be considered by a multidisciplinary team of specialists.

The following paper by Ryl et al. reports that men with benign prostatic hyperplasia (BPH) and diagnosed testosterone deficiency syndrome (TDS) had significantly higher levels of insulin and insulin-like growth factor 1 and larger abdominal circumference. The authors suggest that visceral obesity and disorders of carbohydrate metabolism may contribute to the reduction of testosterone concentration. Moreover,

a relationship between serum concentration of total testosterone of patients with BPH and the percentage of androgen receptor-positive cells in the prostate has been described.

The last paper in this series by Kolasa-Wolosiuk et al. presents effects of changes of testosterone/dihydrotestosterone ratio on testis morphology of rats born from females fertilized by rats treated by finasteride (a steroidal inhibitor of 5α -reductase type 2 which catalyses irreversible reduction of testosterone into dihydrotestosterone). The authors conclude that finasteride not only decreases the fertility of parental animals, but also negatively affects the development and function of the offspring's testes. These results should be taken into consideration by physicians when deciding about finasteride treatment of men suffering from prostate cancer or BPH.

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