Chapter 1

Introductory Chapter: Growth Disorders

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Additional information is available at the end of the chapter

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For most of the last decade, the field of growth disorders has evolved with more decisive signs of its detrimental potential to the health and development of fetuses, neonates, childhoods, and adults. This introductory chapter is, briefly, embracing themes on the growth disorders including growth hormone deficiency (GHD) and fetal growth restriction (intrauterine growth restriction (IUGR)). It then goes on to cover the effects of GHD or IUGR on different biological systems.

1. Harmful effects of GHD

The numerous actions of GH and insulin-growth factor-1 (IGF-1) play an important role in the health and development of offspring/individual [1–7]. The disorder in this axis/GHD during the development caused several complications including weight defect and developmental distortion [8–12]. A systemic GHD can induce hypersensitivity (mechanical and thermal) during the early postnatal period [13]. Also, GHD can decrease the minerals in bones and increase the risk of fracture in adults [14]. The harmful actions of GHD are reinforced in the presence of hypopituitarism [14–16].

2. IUGR and GH treatment (GHT)

On the other hand, IUGR disrupted the neurodevelopment processes (proliferation, migration, and maturation) [17–20]. IUGR/GHD can cause fetal small for gestational age (SGA) [21] and increase the risk of cardiovascular, renal, visual, and mental diseases [22]; diabetes mellitus/obesity (increase in fat mass) [23, 24]; metabolic inflammation [25]; liver dysfunction [26]; mitochondrial imbalance (impair oxygen transport capacity) [27]; or immune problems [28, 29]. Moreover, GHD can delay the development and maturation of the male reproductive system [30] and the female reproductive system [31, 32]. The GHT is more effective on the female fertility [31], sperm efficiency [33], and mood and cognitive behavior in patients with

GHD [34]. The outcome results of GHT depend on the age, gender, body mass index (BMI), muscle/bone index, and waist circumference. However, studies of possible effects of GHT on the gonads (sperm/ova quality) and fetal growth patterns in pregnancy are scarce.

Thus, the current *Growth Disorders* book will be of consciousness to scientists, embryologists, neuroendocrinologists, neurotoxicologists, and physicians coveting to follow recent publications in this field. This book explores in more detail the effects of GH and its deficiency on the brain, cardiovascular system, female gonadal system (ovarian functioning), liver, kidney, adrenal gland, skeletal muscles, bones, hematopoietic system, and gastrointestinal system in children and adults. Also, this book reviews the causes and diagnoses of fetal growth defect including IUGR and SGA. It describes the role of the pituitary/placental human GH (hGH) and IGF-1 gene family during pregnancy. Another theme of interest in this book is related to the impact of GH on germ cell development (proliferation, migration, and maturation), testicular development, pubertal maturation, testicular steroidogenesis, and erectile function. It follows the role of GH/Insulin/IGF-1 axis in the testicular activity. Finally, this book will discuss the impact of GH replacement therapy during pregnancy and its therapeutic potentials on reproductive health and male infertility.

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