CHAPTER 2

MOLECULAR ASPECTS OF OOCYTE VITELLOGENESIS IN FISH

PATRICK J. BABIN¹, OLIANA CARNEVALI², ESTHER LUBZENS³, AND WOLFGANG J. SCHNEIDER⁴

¹Génomique et Physiologie des Poissons, Université Bordeaux 1, UMR NuAGe, 33405 Talence, France
²Dipartimento di Scienze del Mare, Università Politecnica delle Marche, Via Brecce Bianche 60131, Ancona, Italy
³National Institute of Oceanography, Israel Oceanographic and Limnological Research, Haifa 31080, Israel
⁴Department of Medical Biochemistry, Max F. Perutz Laboratories, Medical University Vienna, Dr. Bohr-Gasse 9/2, A-1030 Vienna, Austria

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1. INTRODUCTION

The ability of an oocyte to develop into a viable embryo depends on the accumulation of specific maternal information and molecules. Oocyte growth, particularly in oviparous species, is characterized by the intense deposition of products; e.g. RNAs, proteins (including growth and transcription factors), lipids, vitamins, and hormones. The deposit and storage occur in teleost fish species in a physiologically arrested cell at the G2/M border in first meiotic prophase (see Chapter 1). Whereas the nucleus remains in the diplotene stage, maternal RNAs are produced endogenously by the oocyte (see Chapters 3 and 6). As in other oviparous vertebrates, oocyte growth occurs by the uptake of plasma egg yolk precursor proteins (EYPP), predominantly vitellogenins (Vtgs) and putatively very low-density lipoprotein (VLDL) constituents during the vitellogenesis phase of oogenesis (for reviews see: Wallace, 1985; Mommsen and Walsh, 1988; Wallaert and Babin, 1994; Tyler and Sumpter, 1996; Wiegand, 1996). In females, these lipoproteins are synthesized in the liver, mainly under 17β-estradiol (E2) control (Wallaert and Babin, 1992), and