Institut Européen de Chimie et Biologie

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# *Dynamics of cell growth and division.*

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The most basic unit of life is the cell and the most fundamental function of cells is to grow and divide, thus propagating life. Cells grow and divide via a controlled series of events termed the cell cycle. The fidelity of the cell cycle ensures that most cell divisions result in two identical daughter cells; however, the cell cycle is also sufficiently adaptable that communication between cells led to synchronous division, cell-cell contact and the evolution of multicellular life. Given the fundamental nature of the cell cycle, the core regulatory mechanisms responsible for cell cycle progression have proven remarkably conserved among eukaryotes. This conservation has enabled principles gleaned from simple unicellular eukaryotes to be applied to more complex multicellular systems, including humans. The impetus to understand the logic of the cell cycle in humans is driven by the fact that cancer, a major cause of mortality, is defined by uncontrolled growth and division. During the cell cycle, the pattern and amount of cell growth, combined with the timing of division contributes to the final size and shape of cells. Since cell shape is inherently linked to cell function, it seems reasonable to propose that understanding the mechanisms that coordinate cell growth and cell cycle progression therefore represent a fundamental challenge in cell biology.

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