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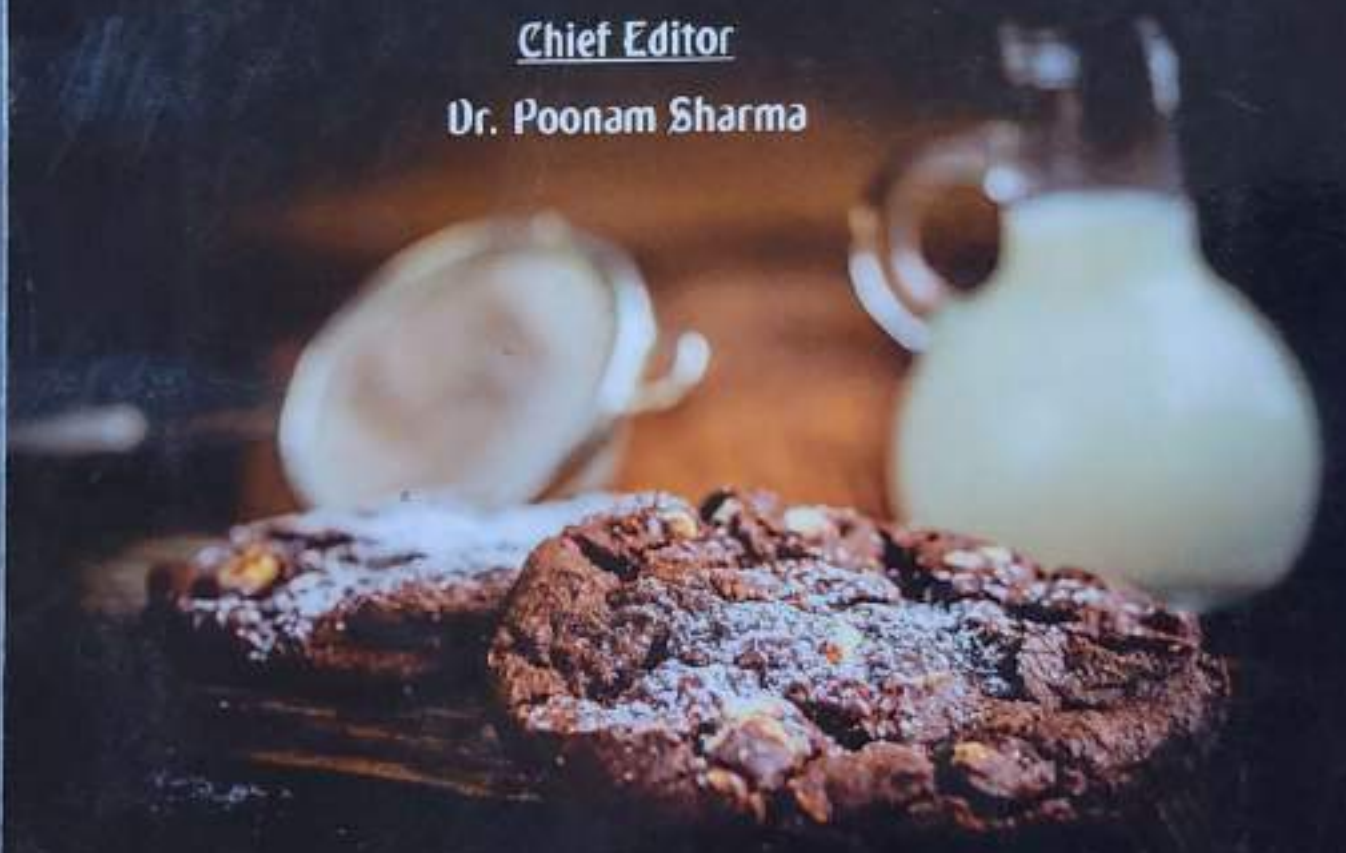

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# Chapter - 6

## A1/A2 Milk Hypothesis, β-Casomorphins and Type 1 Diabetes Mellitus

Dr. Mohammad Raies-Ul-Haq, Dr. Mohd Iqbal Bhat, Dr. Aasima Hamid and Dr. Gulzar Ahmad Bhat

**Abstract**

A fascinating and potentially significant A1/A2 milk hypothesis regards A1 cow milk as a risk factor for incidence of type 1 diabetes mellitus (T1D). It is hypothesized that in this milk, β-casomophin-7 (BCM-7) is released which is actually considered a hypothetical risk factor. The release of this peptide and its pharmacological activity (like morphine opioid) is explained in terms of biochemical proteolytic pattern of A1 β-casein. The data generated through ecological, animal and case controls studies strongly support this hypothesis. Although, the controversial data lack well-designed research approaches and undisclosed feed compositions can't be underestimated. Therefore, more clinical research in humans, animal trials and exploration of signal cascade mechanisms at cellular level will ultimately decide fate of this hypothesis.

**Keywords:** A1/A2 β-casein, β-casomorphins, type 1 diabetes mellitus, ecological studies

### Introduction

Cow milk is an intricate nutritive fluid for human beings from childhood with various nutritious and health benefits. It provides high quality nutrients including carbohydrates, proteins, lipids, vitamins, minerals, immunoglobulins, hormones, growth factors, cytokines and enzymes. The lipids exist in emulsified globules in membranes while proteins occur in colloidal dispersions as micelles in which casein as a major fraction persist as colloidal complex with salts, primarily calcium (Visioli & Strata, 2014). Besides widely publicized nutritive function, milk also expresses numerous physiological activities mostly attributed to proteins and peptides that have strong impact in terms of digestion and metabolism as from absorption of nutrients to growth and development and disease resistance (Park & Nam,

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