Chapter 3

Aims And Objectives

Chapter 3

Aims and objectives

The broad objective of the present thesis is to investigate the cytotoxic potential of camel milk and its bioactive components. The possible mechanism of action also has been investigated. Furthermore, a structural comparison of α-lactalbumin, a vital component of an established molecule with anti-cancer activity has been conducted using bioinformatics tools. In view of it the following specific objectives are proposed:

Objective 1: To study the cytotoxic properties of camel milk components and its associated mechanism(s).

For this, the cytotoxic ability of whole camel milk, its whey and casein components were evaluated against a human transformed cell line. The untreated transformed human cells were taken as negative control while the cisplatin treated cells as a positive control. The bioactive whey component was used to subsequently study the cytotoxicity related parameters. The migration inhibition potential of the active component (whey) was studied by the cell migration assay. Its ability to cause DNA fragmentation was tested. Lastly, in order to understand the underlying mechanism, its ability to induce apoptosis was investigated by the caspase assay.

Objective 2: To conduct the fractionation of camel milk to derive its antineoplastic bioactive component.

For this the Camel milk was first fractionated to whey and casein. Then the whey fraction was subjected to further purification using gel filtration chromatography to yield a purified bioactive fraction. FPLC was also used to verify the result. Furthermore, LCMS-MS analysis was used to analyse the various components present in the camel milk whey fraction.

Objective 3: To conduct an *In silico* comparative structural analysis of camel α-lactalbumin, with other mammalian species.

α-lactalbumin being a vital component of XAMLET (a term for anti-cancer molecule of α-lactalbumin with oleic acid, across the mammalian species) has been used for further structural comparisons. The primary and secondary structures of α-lactalbumin protein of camel milk was compared with four other species namely: human, cow and goat. Comparative conformational structure analysis of α-lactalbumin amongst the four species was also conducted. In addition to this the calcium binding domain of α-lactalbumin in the four species were compared by using suitable software tools.