TFF3 (Trefoil Factor 3) is a protein belonging to the trefoil factor family, which is characterized by its three-looped structure. TFF3 is primarily expressed in the gastrointestinal tract, although it is also found in other tissues, such as the respiratory and reproductive systems. Here are some key features and functions of TFF3:

Structure: TFF3 consists of a central trefoil domain with three loops stabilized by disulfide bonds. The trefoil domain allows TFF3 to adopt a compact and stable structure. Additionally, TFF3 contains a hydrophobic leader sequence that facilitates its secretion and localization.

Gastrointestinal protection: TFF3 plays a crucial role in protecting and maintaining the integrity of the gastrointestinal mucosa. It is produced by goblet cells in the stomach, intestine, and colon. TFF3 is involved in maintaining the mucus layer that lines the gastrointestinal tract, which acts as a barrier against toxins, pathogens, and mechanical damage.

Epithelial repair and regeneration: TFF3 is important for the repair and regeneration of damaged epithelial tissues. It promotes cell migration, proliferation, and wound healing in various epithelial tissues, including the gastrointestinal tract and the respiratory system. TFF3 acts by stimulating cell adhesion, reducing cell death, and enhancing tissue remodeling processes.

Anti-inflammatory activity: TFF3 exhibits anti-inflammatory properties by modulating immune responses. It can suppress the production of pro-inflammatory molecules and promote the secretion of anti-inflammatory factors, thus contributing to the resolution of inflammation.

Tumorigenesis and cancer progression: TFF3 expression has been associated with certain types of cancers, including gastrointestinal, breast, and ovarian cancers. TFF3 has been found to promote cell survival, inhibit apoptosis, and enhance tumor cell migration and invasion. Its overexpression is often correlated with more aggressive tumor behavior and poor prognosis in cancer patients.

Other roles: TFF3 has been implicated in other biological processes, such as embryonic development, reproductive function, and wound healing in non-gastrointestinal tissues.

In summary, TFF3 is a protein primarily expressed in the gastrointestinal tract, where it plays important roles in maintaining mucosal integrity, promoting epithelial repair, and modulating inflammatory responses. While its protective functions are critical for normal gastrointestinal physiology, aberrant expression and function of TFF3 have been associated with tumorigenesis and cancer progression in certain tissues.