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Expression, subcellular localization and tissue localization of a novel parasitic nematode-specific protein from bovine filarial parasite *Setaria digitata*

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Parasitic nematodes may have common properties in parasitizing the host that are conferred by their genetic background. This work reports on the heterologous expression of parasitic specific gene (*SDUP*) and subcellular and tissue localization of its product (SDUP) from cattle filarial nematode *Setaria digitata,* that was found only to be present in parasitic nematodes. *SDUP* was expressed in pET expression system and purified using Ni-NTA affinity chromatography. The purified protein was used as the antigen for preparation of anti-SDUP antibodies. In Immunohistochemical staining using the antibody the highest expression of SDUP was seen in the longitudinal muscles of the body wall of adult males and females indicating its possible involvement in parasite locomotion and tissue modeling. Moderate expression was observed in reproductive organs of both sexes suggesting its role in male and female reproduction. A low level of expression was seen in the cuticle, syncytial hypodermis region, lateral line and intestinal wall and almost no / very faint staining was observed in the epicuticle, nerve cord, tissues inside the uterus, uterine wall, oesophagus, intestine and the body cavity. Further, the expression of SDUP was also seen in developing microfilaria within the uterus of female worms, developing spermatozoa of males and different developmental stages of embryos showing its involvement in nematode growth and development. Subcellular localization of SDUP using green fluorescence construct in yeast, *Pichia pastoris* revealed the protein to be localized mainly in the nucleus and partly in the cytoplasm. Comprehensive bioinformatics analyses indicated the protein to have nuclear localization signals, sequence similar a part of nuclear factor localization-like domain and potential sites for phosphorylation. Therefore, taking these outcomes together, it can be suggested that SDUP is a mainly muscle and reproductive system protein localized in both the nucleus and the cytoplasm, it may be regulated *via* phosphorylation and dephosphorylation and it is involved in growth and development as it was found in abundance in all the developmental stages investigated in this study.

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