SUMMARY AND CONCLUSION
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In the present work isolation of tumor associated antigens (TAAs) in female and male breast cancer patients, their immunological and physicochemical properties, and relatedness to murine mammary tumor associated antigens have been studied.

A 83 Kd murine mammary tumor associated antigen (MTAA) has been purified from MuMTV induced spontaneously arising mammary tumors (MMT) in C3H/Jax mice by DEAE discontinuous gradient column chromatography. Following a similar protocol, partial purification of a human malignant breast tumor associated antigen (BTAA) was achieved from malignant breast tumor tissue (MBT). The fraction 1 (HF1) of MBT was found to have BTAA activity as indicated by its strong reaction with the sera of female breast cancer patients in ELISA and in immunoblot analysis. The reactions of the sera with HF1 persisted even after their absorption with normal human breast tissue pellets (NHB). The antigen was further purified through SDS-PAGE, SE-HPLC and affinity chromatography.

On SDS-PAGE analysis, it has been found that HF1 resolved into 6 major protein components of which the band 3 (HF1-3) having a MW of 85 Kd was found to be antigenically reactive. The DEAE fraction 1 (NHF1) of normal human breast tissue also resolved into 6 protein bands. The patterns of the first four bands of both HF1 and NHF1 were very similar. But though same amounts of proteins were charged, the band 3 (NHF1-3) of NHB was of much lower intensity in comparison to that of HF1-3. The BTAA lost its reactivity with breast cancer sera following treatment with proteolytic enzymes trypsin and papain and with neuraminidase. The antigen was found to be highly thermostable. The BTAA failed to react with anti-MuMTV serum and thus might not be immunologically related to the MuMTV structural antigens. But BTAA was found to be cross-reactive with the 83 Kd MuMTV coded glycoprotein MTAA. Therefore a viral association with human breast cancer cannot be ruled out. Though several breast tumor markers having fetal origin have been reported in breast cancer patients, BTAA was not found to be related with fetal antigens.
A high titer of circulating antibodies against the BTAA was observed in the sera of breast cancer patients as compared to that in the sera of healthy controls and patients with benign breast diseases and carcinoma of organs other than breast even after repeated absorption of the sera with NHB tissue pellets. Using monoclonal antibodies, the BTAA reactive antibody was found to be of IgG$_2$ subclass. Significant lowering of the antibody titer in the post-operated patients in comparison to that of pre-operated ones was noted. The level of these antibodies in the sera of breast cancer patients gradually decreased with increase of time interval following removal of the tumor load. Thus, BTAA appears to have both diagnostic and prognostic significance for female breast cancer.

In contrast to female breast cancer, carcinogenesis in male breast is very rare. An attempt was made to explore presence of BTAA specific antibodies in male breast cancer patients, as was observed in female breast cancer. But no circulating antibodies were observed against BTAA in male breast cancer patients' sera. However, in these patients circulating antibodies were observed against the DEAE fraction 3, MF$_3$ and HF$_3$, of MMT and MBT respectively. A 70-72 Kd component isolated from MF$_3$ and HF$_3$ was found to react specifically with the sera from male patients. Antibodies were not found against these fractions in the sera of normal healthy male individuals. Both the fractions MF$_3$ and HF$_3$ reacted strongly with anti-MuMTV serum. These observations suggested that male breast cancer tissue might express antigenic molecules, immuno-logically related to MuMTV structural proteins. Absence of such antigens in female breast carcinoma indicates that the process of carcinogenesis in male and female breast may differ mechanistically.