The current study of TGF-β axis molecules in breast carcinoma has been a unique study. This study covered almost all aspects that have never been reported so far in a single study. All the molecules especially growth factors have been assessed at three different levels (Circulatory, tumoral — protein and tumoral — mRNA). Other six genes (three receptors and three SMADs) have been determined at mRNA level. An attempt was made to find out the utility of these molecules — establish them as biomarker — can be useful either as prognostic marker, disease monitoring marker or surrogate marker. Differential expression patterns have been assessed at different stages of the disease; correlations with clinical and pathological prognosticators, ROC curve analysis, survival analysis, changes with disease extension — all the possible combinations have been checked and presented in the thesis. In addition, cross-talk between ERs and TGF-βs has also been explored.

- **TGF-β₁**: May be used as a biomarker (prognostication): Highest abundant protein (Circulatory and Tumoral); Showed significance with clinico-pathologic prognosticators; Down regulated in early tumors and up regulated in advanced tumors; Increase (at protein, RNA levels) was connected to reduced RFS and OS
- **TGF-β₂**: Circulatory levels: No change, Inverse correlation: protein level and transcript level. Increase connected to better prognosis
- **TGF-β₃**: ROC: Biomarker. Significantly higher circulatory levels in patients than controls for both Serum and Heparin Plasma; Reduction in tumor levels than normal tissues; Down regulation of transcript: Not reported as yet.
- **TβR- I and TβR- II** — unique and reverse expression pattern — Significance of each of them in signal transduction established
- **TβR-III** showed highest expression amongst all the receptors (Previously not reported in literature)
- All three SMADs exhibited almost similar patterns of up- and down-regulation.
- **SMAD-4** showed unique pattern and found to have an important role in signaling cascade
• SMAD-3 and SMAD-7 good correlation with clinico-pathologic prognosticators
• ER down regulated tumors: candidates for anti TGFβ2 strategies

TGFβ switch ⇒ Dual role of TGF β axis with advance in disease stage is proven in the current study