

Letter to the Editor

Trigonella and it's rapidly emerging anti-neoplastic effects

I read with great interest the recent article by Kumar et al¹. Interestingly, recent data suggests that *Trigonella* may exert a number of anti-neoplastic effects besides its anti-hyperglycemic effects.

For instance, diosgenin (one of the saponins of *Trigonella*) is effective in reducing tumor growth in squamous cell carcinomas. It mediates these anti-neoplastic effects by augmenting the Bax/Bcl-2 ratio². Phosphorylation of Akt is also attenuated. *Trigonella* also contains thymoquinone which exhibits synergistic effects with diosgenin and thereby markedly accentuates intra-tumoral apoptosis. Similar actions are seen in malignant melanomas. In these tumors fenugreek attenuates the production of tumor necrosis factor- α ³. 26-O- β -D-glucopyranosyl-(25 R)-furost-5(6)-en-3 β is the primary saponin that mediates these anti-malignant effects.

Similarly, diosgenin attenuates the expression of matrix metalloproteinase-2 and matrix metalloproteinase-9 in prostate carcinomas besides inhibiting the ERK pathway as well as VEGF expression⁴. As a result it markedly decreases invasiveness in prostate malignancies. A simultaneous decrease in NF- κ B activity is also seen. Malignant cell migration is also markedly attenuated. Typically, this attenuation of tumor invasiveness is accompanied by an increase in TIMP-2 levels. Similarly, diosgenin inhibits the formation of aberrant crypt foci in the colon⁵. A simultaneous increase in the expression of caspase-3 is also seen. Diosgenin mediates these effects in a dose dependent manner. It also inhibits Bcl-2 and thereby enhances apoptosis in colon carcinomas.

Similarly, fenugreek inhibits intra-tumoral growth in breast malignancies. Fenugreek administration results in a marked increase in intra-tumoral apoptosis⁶. These effects are seen secondary to fenugreek induced accentuation of expression of Bax⁷. Increased expression of FADD also causes further enhancement of apoptosis. Intra-tumoral apoptosis is increased in a dose dependent manner.

The above examples clearly illustrate the anti-neoplastic effects of *Trigonella* and the need for further studies in this regard.

Goldenhar syndrome, also known as oculo-auriculo-vertebral spectrum, is a complex, heterogeneous condition characterized by abnormal development of facial structures derived from the first and second branchial arches of the embryo. Associated anomalies also include asymmetry or hypoplasia of the face or mandible, unilateral epibulbar dermoids, colobomas of the upper lids, vertebral anomalies, and lateral facial clefts¹.

The association of pulmonary agenesis with facial microsomia has been described in a few cases and the syndrome with pulmonary agenesis is termed an expanded Goldenhar complex²⁻⁴. Here we report the first case of Goldenhar syndrome in the literature with an additional finding of costal agenesis.

References

- 1) KUMAR P, KALE RK, BAQUER NZ. Antihyperglycemic and protective effects of *Trigonella foenum graecum* seed powder on biochemical alterations in alloxan diabetic rats. Eur Rev Med Pharmacol Sci 2012; 16(Suppl 3): 18-27.
- 2) DAS S, DEY KK, DEY G, PAL I, MAJUMDER A, MATICHODHURY S, KUNDU SC, MANDAL M. Antineoplastic and apoptotic potential of traditional medicines thymoquinone and diosgenin in squamous cell carcinoma. PLoS One 2012; 7: e46641.
- 3) KAWABATA T, CUI MY, HASEGAWA T, TAKANO F, OHTA T. Anti-inflammatory and anti-melanogenic steroidal saponin glycosides from Fenugreek (*Trigonella foenum-graecum* L.) seeds. Planta Med 2011; 77: 705-710.
- 4) CHEN PS, SHIH YW, HUANG HC, CHENG HW. Diosgenin, a steroidal saponin, inhibits migration and invasion of human prostate cancer PC-3 cells by reducing matrix metalloproteinases expression. PLoS One 2011; 6: e20164.
- 5) RAJU J, PATLOLLA JM, SWAMY MV, RAO CV. Diosgenin, a steroid saponin of *Trigonella foenum graecum* (Fenugreek), inhibits azoxymethane-induced aberrant crypt foci formation in F344 rats and induces apoptosis in HT-29 human colon cancer cells. Cancer Epidemiol Biomarkers Prev 2004; 13: 1392-1398.
- 6) KHOJA KK, SHAF G, HASAN TN, SYED NA, AL-KHALIFA AS, AL-ASSAF AH, ALSHATWI AA. Fenugreek, a naturally occurring edible spice, kills MCF-7 human breast cancer cells via an apoptotic pathway. Asian Pac J Cancer Prev 2011; 12: 3299-3304.
- 7) AMIN A, ALKAABI A, AL-FALASI S, DAOUD SA. Chemopreventive activities of *Trigonella foenum graecum* (Fenugreek) against breast cancer. Cell Biol Int 2005; 29: 687-694.

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