

## Solutions to [Test Your Knowledge: Tumors and Glomerular Diseases](#)

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|---------------------------------|---------------|
| 1. Spleen sarcoma               | G             |
| 2. Renal cell cancer            | A,D,E,F,G,H   |
| 3. Tongue cancer                | D             |
| 4. Teratoma                     | B             |
| 5. Cervical cancer              | B             |
| 6. Thymoma                      | A,E,F,H       |
| 7. Hodgkin lymphoma             | A,B,D,E,F,G,H |
| 8. Myeloproliferative disorders | A             |
| 9. Breast cancer                | A,B,C,H       |
| 10. MGUS                        | H             |

### Discussion:

Nephropathies have rarely been observed associated with *thymoma*. There have been reports with minimal change disease, focal segmental glomerular sclerosis (FSGS), membranoproliferative disease (MPGN), and crescentic glomerulonephritis. However, in most of the published cases of thymoma associated with nephrotic syndrome, histological examination indicates minimal change disease as described in the [case in AJKD](#).

*FSGS* is rarely associated with solid tumors. Of these, RCC and thymoma are the most frequently reported. Hodgkin disease, non-Hodgkin lymphoma, and all forms of leukemias are found with FSGS. Myeloproliferative disorders, like essential thrombocythemia and polycythemia vera, have been reported with FSGS.

Many solid tumor malignancies have been associated with *membranous nephropathy*. The pathogenesis of cancer-associated membranous nephropathy is believed to involve deposition of in situ formation of glomerular immune complexes. As seen above, breast cancer, teratomas, and cervical cancers are most commonly associated with membranous nephropathy.

*Minimal change diseases* can be seen with tumors of the gastrointestinal tract, as well as hematologic malignancies such as leukemias and lymphomas.

*IgA nephropathy* has been found with solid tumors of the respiratory tract, the buccal mucosa, and nasopharynx. IgA nephropathy is a disorder of the mucosal immune system which constitutively secretes IgA capable of forming immune complexes. Tumors of the mucosal immune system, particularly of the upper respiratory tract, have a significant association with IgA nephropathy.

Recent associations have been described between *MPGN* and monoclonal gammopathy of unclear significance (MGUS). MPGN with MGUS should be a clue to underlying chronic lymphocytic leukemia. Mayo Clinic analyzed kidney biopsies of patients with MPGN, and the most important association were with a monoclonal gammopathy. MPGN also can be seen in other leukemias, gastrointestinal tumors, and melanomas.

*Thrombotic microangiopathy* has been observed in patients with mucin-producing gastric, lung, and breast cancers.

*Crescentic glomerulonephritis* can be seen in lung cancer, chronic lymphocytic leukemia, Hodgkin lymphoma, and renal cell carcinoma to name a few. *AA amyloidosis* is a paraneoplastic syndrome that is often overlooked, and associated with Hodgkin disease, renal cell carcinoma, bladder and gastric cancers, and sarcoma of the spleen.

A summary of these findings can be reviewed [here](#).