

**(All hand-in problems must be completed on separate pages & all short answer questions must be typed)**

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As scientists and doctors learn more how to integrate genetic and clinical data for patients diagnosed with cancer, we find ourselves on the doorstep of a revolution in cancer diagnosis and treatment. Oncologists are making connections between genetic mutations and therapeutic strategies and also screening for “biomarkers” at the outset of diagnoses. The outcomes of these tests influence treatment options and prognoses.

Do some research into “triple-negative breast cancer” (TNBC) and answer the following questions your sources cited. Each answer should be between 200 and 300 words.

1. The ‘triple’ of triple-negative breast cancer refers to three cellular receptors. What kind of receptors are they and what are their natural ligands/signals? Briefly describe the signal transduction pathways in which these receptors are involved in non-cancer cells.
2. What are the therapies that are ruled out for patients with TNBC and how would these therapies treat cancer in patients with other forms of breast cancer?
3. What are some of the treatment options (excluding surgery and radiation) for patients with TNBC?
4. Though TNBC was identified as a subtype of breast cancer with particular molecular hallmarks, oncologists recognize that there are subtypes of TNBC at the genetic level that require further differentiation at the treatment level. What are some of the genetic differences of these subtypes and how might these differences affect treatment options?