Title: Liquid biopsy is useful to find cancer clonal changes and to develop personalized cancer immunotherapy.

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Abstract:

Liquid biopsy can be rapid and non-invasive alternative to tumor biopsies for detecting genetic mutations in circulating tumor DNA (ctDNA) within blood sample. The information is useful to find possible target therapy medications and characteristics of tumor cell clones.

Using liquid biopsy, we have checked blood samples of cancer patients under chemotherapy and/or radiotherapy with dendric cell- based immunotherapy. The result demonstrated that average number of somatic mutations found in samples are 5.6 in which 3.6 are nonsynonymous. TP53 mutations are most frequent. Approximately 95% of mutations are specific to each patient, which may lead to personalized cancer therapy. We then compared liquid biopsy results between before and after of 3 months' cancer treatment course. We also proposed the criteria of 'genomic (g) RECIST'. According to changes of ctDNA, more than 99% loss, 30-99% loss, 30% loss to 20% gain, more than 20% gain are defined as genomic complete response (gCR), genomic partial response (gPR), genomic stable disease (gSD) and genomic progressive disease (gPD), respectively. There are some inconsistencies between genomic RECIST and RECIST by radiologic findings. Genomic RECIST may proceed radiological RECIST. We found newly formed ctDNA levels can be the most prognostic parameter in tumor progression or the treatment response, while ctDNA clearance and the rise and decline in existing ctDNA changed less.

Neoantigens are cancer specific peptides arose from somatic mutations in cancer cells. They are related to natural anti-cancer immunity and effect of immune checkpoint inhibitors. Neoantigens are now begun used for cancer immunotherapy. Usually, neoantigens are selected by DNA and mRNA analysis of resected tissue samples. But in advanced cancer cases, getting new tissue sample is rarely possible. Using old tissue sample is not appropriate because cancer clones change very frequently. We started personalized treatment protocol of chemotherapy and/or radiotherapy with dendric cell- based immunotherapy using neoantigen peptides which are newly synthesized from information of nonsynonymous mutations by liquid biopsies of each patient.

Biography:

Junichi Taguchi, MD, PhD, FJSIM, FJCC, FACC
Graduated University of Tokyo.
Previously, Court Physician of the Japanese Emperor/Royal Family.
Presently, Chief Medical Director of Tokyo Midtown Clinic and Director of Center for Advanced Medical Science and Technology at Tokyo Midtown.
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Main research interests are executive healthcare, preventive medicine using CT, MRI and PET scans, clinical genetics of atherosclerosis and cancer, cancer precision medicine with liquid biopsy, regenerative medicine against atherosclerosis using adipose tissue-derived stem cells.
Recent innovation of our medical system includes introduction of telemedicine and Artificial Intelligence.