



NAME OF LABORATORY: Lab of molecular pathology

PI: Dr. Gilad W. Vainer MD, PhD

Director of Department: Dov Herskovits MD

Research Objectives: Achieving better personalized medicine through the use of state of the art molecular diagnostic tools, including clinical onco-proteomics.

Main Research topics:

- **We are determining what is "onco-proteome".** To date, no one defined the onco-proteome nor provided bioinformatical means to analyze it. Prof. Jurgen Cox (Max-Planck Institute) is the creator of Max Quant proteomics program, one of the most sophisticated and used bioinformatical tool in the proteomic field. Together, we upgraded the infra-structure of the program to be **able to identify somatic mutations, fusion proteins, frame shifts, etc., generated by the somatic mutation** in the cancer cell genome. Currently, only our labs hold this tool.
- As a result of point 1 (see above), we are now in a position to identify and **quantify mutated cancer-related genes at the protein level**, with great sensitivity and specificity.
- It has been shown that the transcriptomics level is only weakly connected to the proteomic level in various tumors. Thus, our onco-proteomics analysis, which is the **effectors level, provides a unique look** into cancer biology.
- We perfected the protein extraction method from formalin-fixed paraffin-embedded (FFPE) cancer tissues. Our innovative method facilitates better protein extraction, better proteome coverage, less variability, and robustness. Our **work flow is easy, stable and time efficient and is now in the grasp of routine pathology departments.**
- We started to make progress in the field of **targeted proteomics**. Today, we have the ability to identify and absolutely quantify several ten of proteins from FFPE material. Because we used stable-heavy isotope peptide mixture that we add to each and every protein extraction, **we can provide the absolute amount of almost any known protein**, irrespective of its cellular localization.

Staff: Mrs. Juliane Kania-Almog, Msc. Student, Ms. Anna Litvin, Lab technologist, Immunohistochemistry

Active Grants:

- **TASMC** Internal funding
- **Rosetrees** trust
- Israeli Science foundation (**ISF**)

Collaborations:

- Prof. Jurgen Cox (Max-Planck Institute),
- Dr. Oliver Schilling (Freiburg University),
- TASMC Orthopedic-Oncology unit & Soft-tissue sarcoma medical unit.

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