Danish National Molecular Tumor Board

History, current status, organization and future perspectives

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INTRODUCTION

Precision medicine (PM) based on molecular profiling (MP) is becoming increasingly important for matching cancer patients with marketed therapies and clinical trials. As MP has evolved from immunohistochemistry to PCR analysis, targeted gene panels to extensive whole genome DNA sequencing (WGS), RNA sequencing, chromosomal aberration (CA) analysis and proteomics, the requirements for analysis, interpretation and clinical application have increased likewise, requiring a national, multidisciplinary approach (figure 1).

Since 2013, the Danish National Molecular Tumor Board (DN-MTB) has evolved into a weekly, multidisciplinary forum for presenting, discussing and giving advice on treatment for cancer patients being molecularly profiled.

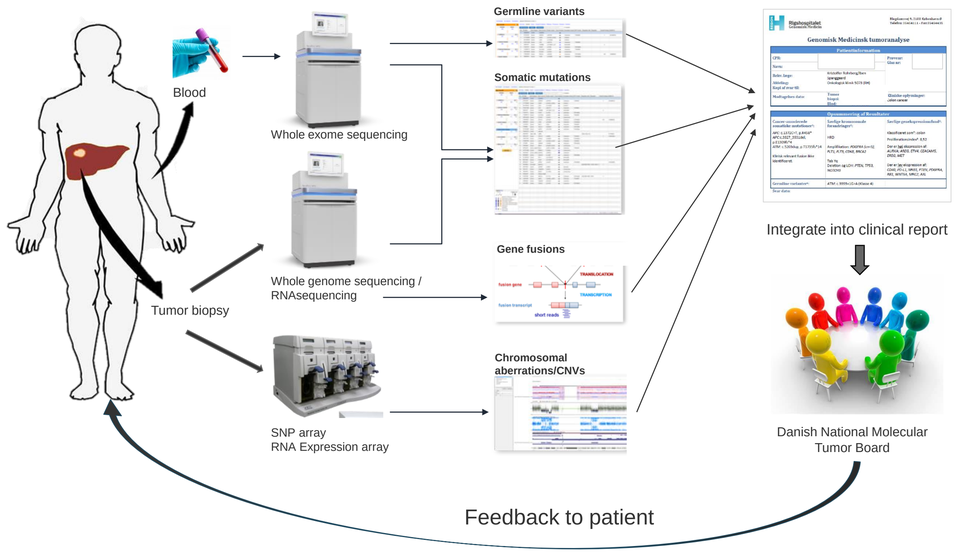

Figure 1: Acquisition of tissue and blood, molecular analysis platform overview and integration into clinically actionable report for review at DN-MTB.

MATERIAL AND METHODS

First established in 2013 at Rigshospitalet, as a multidisciplinary collaboration, the MTB was held biweekly, weekly from September 2019, with attendance of oncologists, molecular biologists and bioinformaticians, and with pathologists, clinical geneticists, and oncological pediatricians also in regular attendance.
The MTB became national (DN-MTB) in 2018 with inclusion of centers in Aarhus in April and Herlev in October.
Subsequently, centers in Odense, Aalborg, Vejle and Region Zealand have been included in the DN-MTB totaling 7 centers (figure 2).
An average of 23 persons attended each meeting in 2022.

Figure 2: Location and analysis pipeline of oncologic centers in Denmark and number of molecular profiles presented at the DN-MTB in 2020-2022.

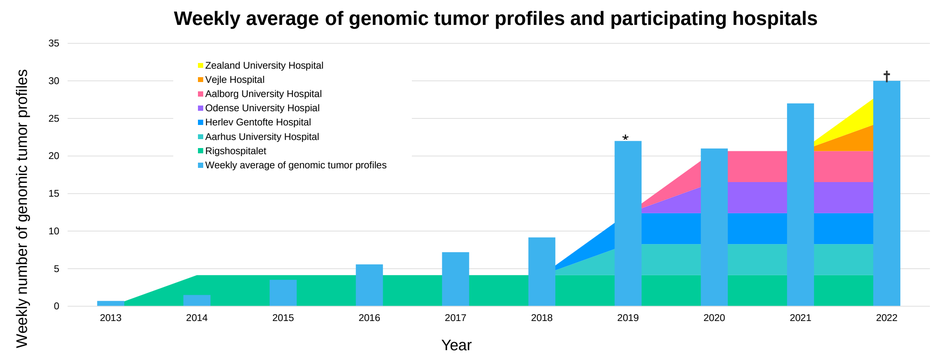

Figure 3: Weekly number of genomic tumor profiles per year (columns) and participating hospitals (colored bands beginning the year the hospital began participation in MTB meetings). *Based only on data from September to October 2019 †Cut-off date 30-JUN-2022

RESULTS

The average weekly number of MPs discussed at DN-MTB have steadily increased over the years from 0.5/week in 2013 to 30/week in 2022 (figure 3).
By 2022, most MPs include data from whole exome/genome somatic DNA sequencing, CAs, RNA expression and sequencing whilst a minority are based on large commercial gene panels (161 to +500 gene coverage). MPs may also include germline sequencing for filtering somatic variants, calling pathogenic germline variants and for CA analysis.

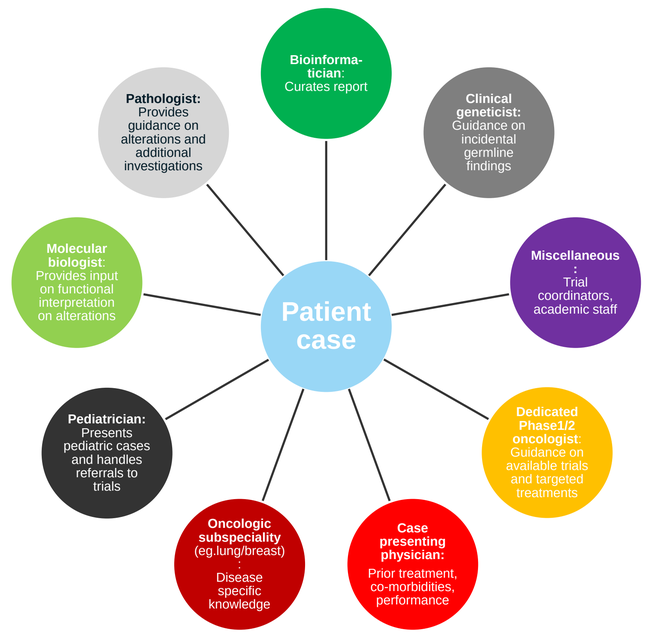

Figure 4: Participants in the Danish National Molecular Tumor Board and related tasks

DISCUSSION

MP increases, as access to advanced multiplexed analyses improves and patients are profiled earlier in their disease course.
As data quantity increases, e.g. more genes covered, adding RNA and protein data, the requirements for processing and analysing molecular data increase likewise. Clinical application by referral to trials or advice on targeted therapies hold great potential for profiled patients but also increase demands of the multidisciplinary boards.
DN-MTB is continuously devoted to developing the organisation, involving clinicians and academics (figure 4), to improve the application of data in personalised medicine.

Purpose of Danish National Molecular Tumor Board

To advise on targeted treatments based on individual molecular profiles
To suggest additional molecular analyses that may be relevant
(e.g.,germline investigations etc.)
To facilitate exchange of experience regarding druggable genomic variants/profiles and targeted treatments

Not within the purpose of DN-MTB

To recommend and/or prioritize between standard treatments
To make final treatment decision for the individual patient

Abbreviations:
CA: chromosomal aberration, CNV: copy number variation, DN-MTB: Banish National Molecular Tumor Board, MP: molecular profiling/profile, MTB: molecular tumor board, PCR: polymerase chain reaction, PM: precision medicine, SNP: single nucleotide polymorphism, WES: whole exome sequencing, WGS: whole genome sequencing

Region Hovedstaden · Region of Southern Denmark · midt Central Denmark Region · Region Zealand Zealand University Hospital · Aalborg Universitetshospital – i gode hænder