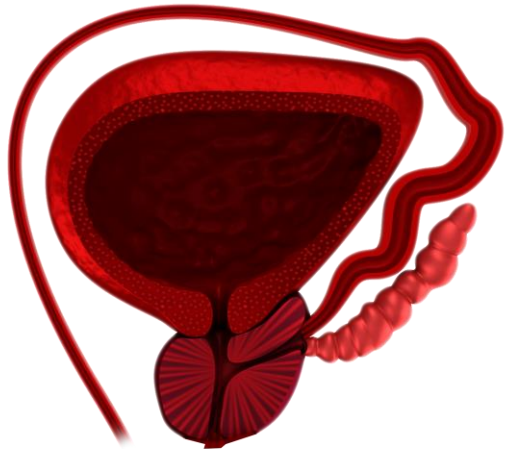
Multi-omics molecular treatment targets for Prostate Cancer

What is Prostate Cancer

The **prostate gland** is a male reproductive organ. It secretes prostate fulid, one of the main components of semen. Prostate cancer is a malignant growth in the prostate gland.

Prostate Cancer is the second most commonly diagnosed cancer among men.



Risk factors

Different factors might influence a man's risk of developing prostate cancer:

- **Age**: Increased risk in men over 50.
- **Family history**: Increased risk for patients having a family member with prostate cancer.
- **Race/ Ethnicity**: Black men are at higher risk of developing prostate cancer in comparison to white men.

Forms of Prostate Cancer

Patients suffering from Prostate Cancer may experience indolent or aggressive disease.

- **Indolent disease** - slow growing form of Prostate Cancer, unlikely to progress in the absence of treatment.
- **Aggressive disease** - life-threatening disease in the absence of treatment.

Clinical problem

Accurate discrimination between indolent and aggressive Prostate Cancer is still challenging.

This results in over-treatment of patients with indolent disease and under-treatment of those with lethal disease.

New drugs for advanced Prostate Cancer were recently approved. Low response rate and development of resistance remains a barrier to improve on therapeutic outcomes.

Why studying Prostate Cancer is important

New drugs for Prostate Cancer are urgently needed, linked to the evidence that even though Prostate Cancer is frequently treatable (paradoxically also over-treated) when detected early, once the disease has begun to advance, response to treatment is generally limited and the disease continues to worsen regardless from the means of intervention.

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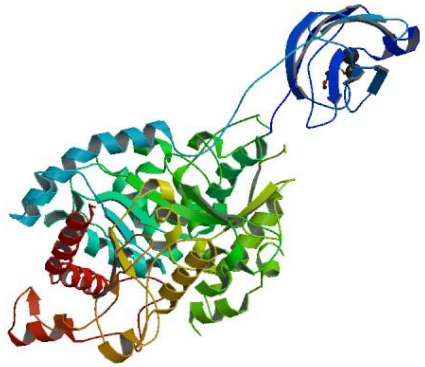
Drug target

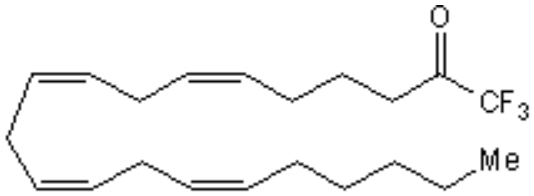
- Usually a protein present in disease-affected tissue
- Associated with disease
- Targeted by a drug to give a curative effect



Selection of the "good" drug target is very important for effective treatment.

Drug candidate

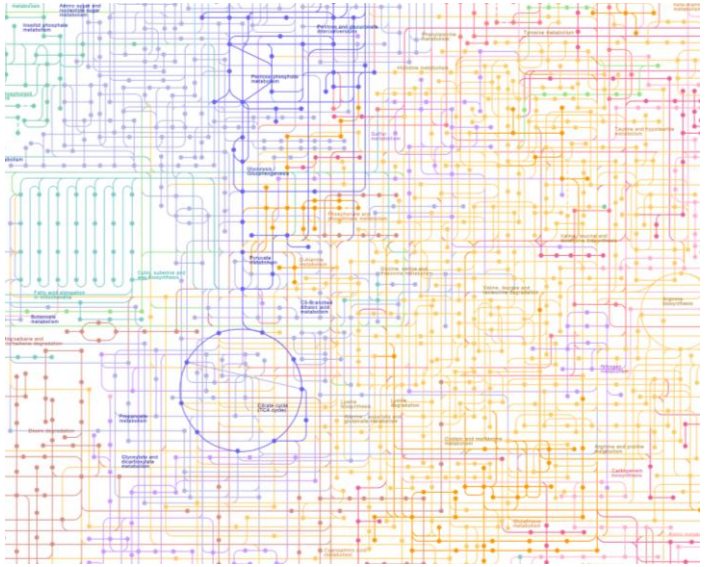
- A compound with therapeutic potential
- It can be antibody, small molecule etc.
- Sufficient selectivity for the target
- Have activity to produce desired effect
- Enough evidence supporting further pre-clinial and clinial development



Challenge

Molecular changes underlying Prostate Cancer development are complex and differ among patients (heterogeneity), which has an impact on the treatment response.

Therefore, selection of a "good" drug target is very challenging.



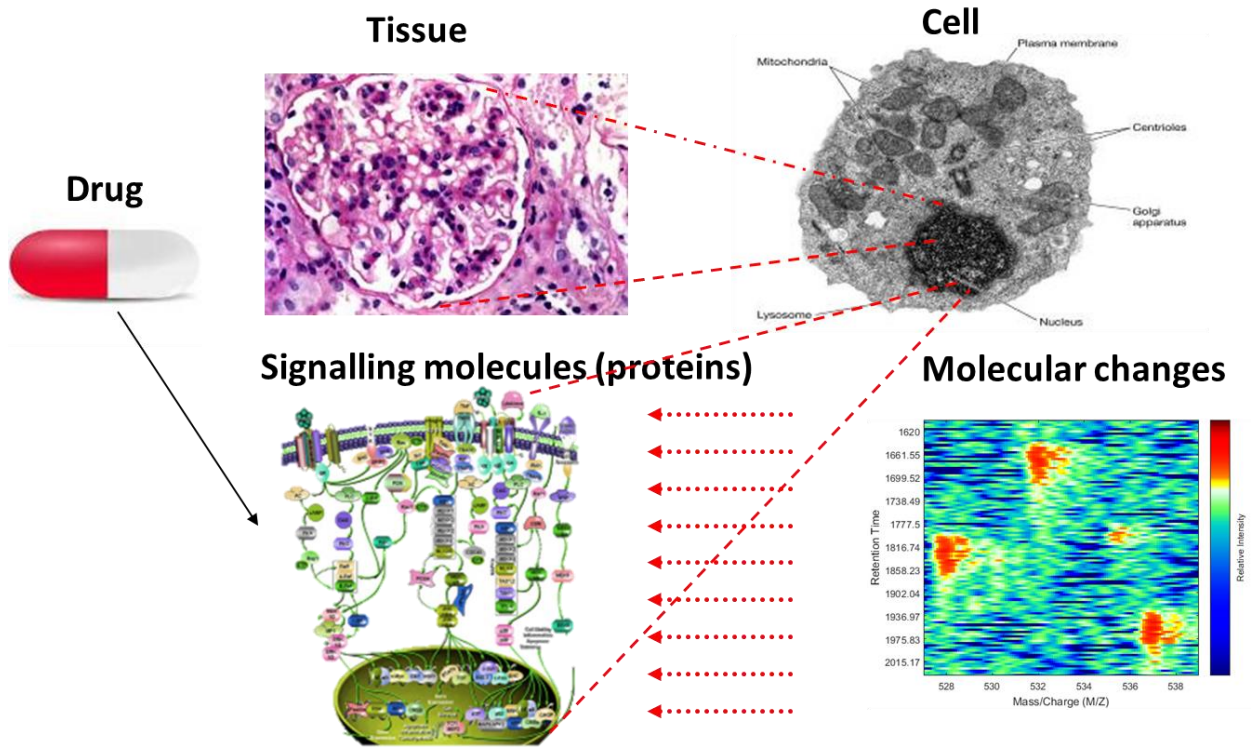
Adapted from: https://www.genome.jp/kegg/

Stumbling blocks for selecting the "good" drug target:

- Insufficient knowledge of the molecular pathophysiology.
- Lack of proper assessment of biological relevance.
- Underestimation of complexity and heterogeneity.

Make it perfect

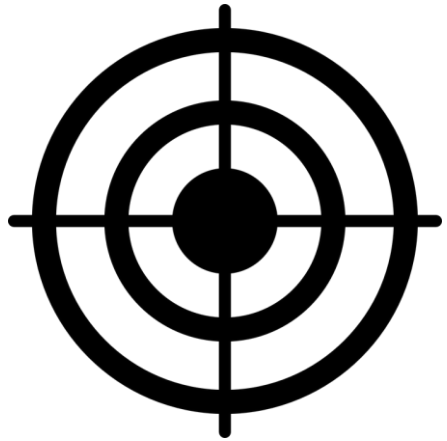
We aim to improve our understanding of molecular changes associated with Prostate Cancer progression to define novel drug targets/ drug candidates based on the molecular pathophysiology.



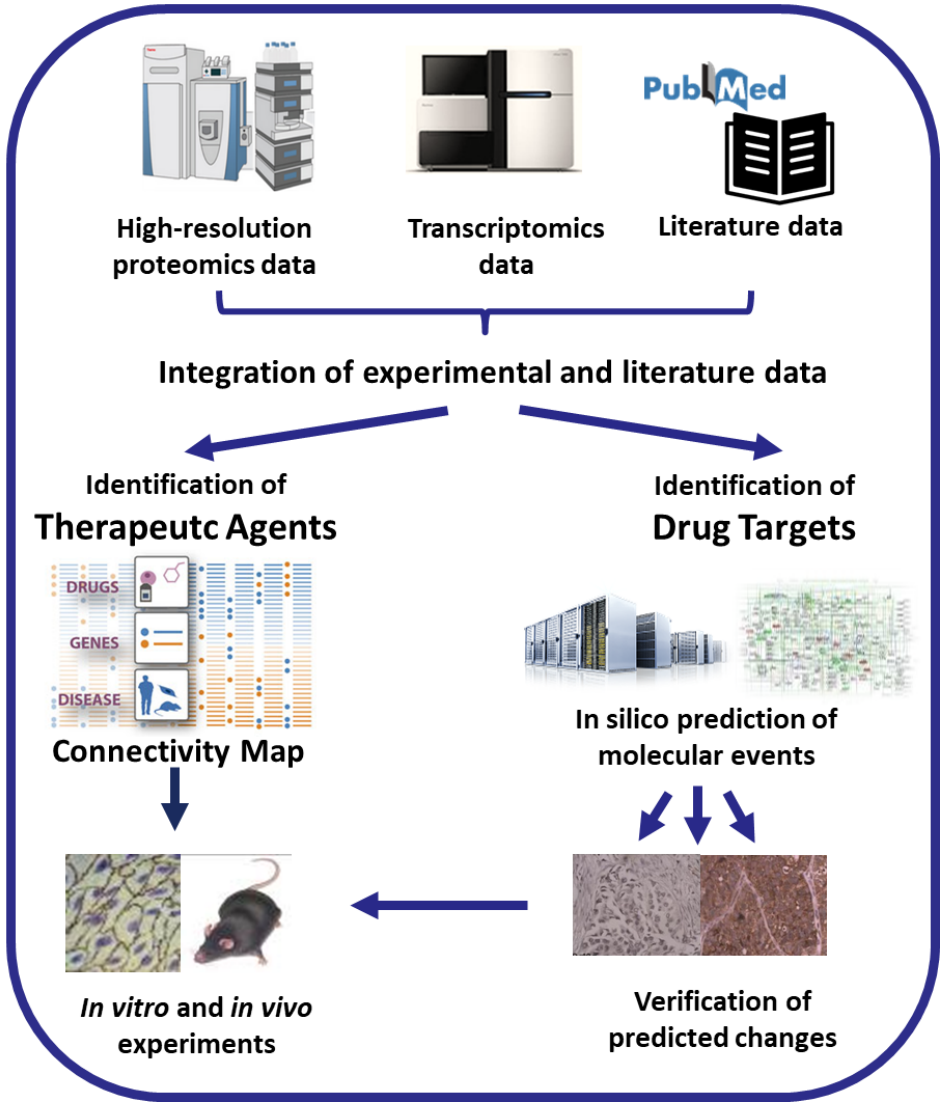
Adapted from: Mischak *et al.* Nephrol Dial Transplant. 2015

PCaProTreat Objectives

1. Establishment of knowledgebase with molecular features related to Prostate Cancer.
2. Characterisation of the molecular changes underlying Prostate Cancer progression through the integration of multi-source (tissue, urine, and seminal plasma) and multi-omics data, complemented with literature-mined data.
3. Definition of biological processes/ pathways and their regulatory elements, followed by their validation.
4. *In silico* prediction of potential drug candidates.



Our Patients' centered approach



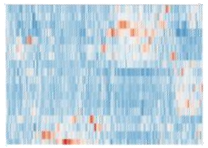
1. Identify novel drug targets through linking the molecular changes to the disease etiology.

2. Predict new drug candidates able to reverse disease phenotype on the basis of the existence of relationship between disease, proteins, and drugs.

Our contribution

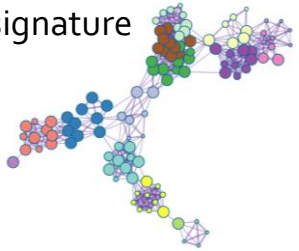
Molecular signature of Prostate Cancer progression

A tissue proteome-based molecular signature comprised of multi-omics and cross-correlated molecular features



Understanding molecular mechanisms of Prostate Cancer Progression

The biological processes and pathways involved in disease progression as revealed based on the molecular signature



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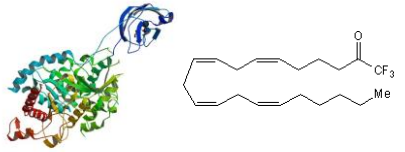
Prostate Cancer knowledgebase

A knowledgebase of disease-relevant molecular alterations

Potential Drug targets / Drug candidates

Novel drug targets / drug candidates defined on the basis of molecular pathophysiology



Where you can meet us?

Detailed information on the PCaProTreat Project is provided in our website

https://pcaprotreat.eu/

Join us on Facebook

https://www.facebook.com/PCaProTreat/

Who we are

PCaProTreat: Multi-omics molecular treatment targets for Prostate Cancer

Marie Skłodowska-Curie Actions

Individual Fellowship

H2020-MSCA-IF-2017-800048

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