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Mapping of Natural Signal Transduction Modulators on Drug Targets Relevant to Prostate Cancer

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ABSTRACT

We have collected hundreds of natural signal transduction modulators from various science articles. During this study we've got projected to seek out the potential drug target for glandular carcinoma mistreatment the natural compounds. The procyanidin is that the effective natural signal transduction modulator for the cure of glandular carcinoma.FOLH1 factor is showing highest interactions, with the opposite glandular carcinoma genes.

KEY WORDS: Cancerous cell, OMIM database, Protein, signal transduction.

1. INTRODUCTION

Cancer: Cancer may be a term used for diseases within which abnormal cells divide while not management and are ready to invade different tissues. Cancer cells will unfold to different elements of the body through the blood and liquid body substance systems.

Cancer isn't only unwellness however several diseases. There are quite one hundred differing types of cancer. Most cancers ar named for the organ or form of cell within which they begin - for instance, cancer that begins within the colon is termed carcinoma; cancer that begins in basal cells of the skin is termed basal cell cancer.

Cancer varieties may be classified into broader classes. It mainly includes:

Tissue cell Cancer – Cancer initiates in tissue cell lines.

Hemorrhagic cancer – Cancer initiates in blood vessels and in different repository tissue.

Bone marrow Cancer – Cancer initiates in lymph and passes through blood vessels.

Metastatic tumor - cancers that begin within the cells of the system.

Brain cancer – Tumor initiates in central nervous system.

Origin: The mechanism of cancer is not well understood and to know how cancer begin in cells can be detected through various methods where the normal cells turn to cancerous cells.

The variety of cells grown can be detected by various division methods and it is required to have our human body with more immune power. Once cells mature, it has got division and can be able to subside with new variety of cells.

During cell growth and division, it can be modified or undergo mutation to form new cells. It requires optimum temperature, cell growth conditions which lead to further modification.

Benign tumors and cancerous tumors are the different unfold elements to invade close tissues and can form unfold cancerous cells to different parts of the body which is called as metastasis.

2. MATERIALS AND METHODS

Materials:

Pubchem: National Institutes of Health (NIHPubChem consists of three dynamically growing primary databases.

Compounds, 37 million entries, contains pure and characterized chemical compounds.

Substances, 71 million entries, contains also mixtures, extracts, complexes and uncharacterized substances·

BioAssay, bioactivity results from 1644 high-throughput screening programs with several million values·

PDB

The Protein Data Bank (PDB) acts as a data bank to identify three dimensional structures which involves in the identification of biomolecules including proteins and aminoacids. It also has nucleic acid structures similar to unknown proteins and amino acids.

It has the structures given by researchers and scientists from many parts of the world and can be produced with low cost effective and environment friendly. It is worldwide known as Protein data bank defined as wwPDB·

Methodology:

Pubchem: SDF structure of signal transduction modulators were retrived using pubchem database.

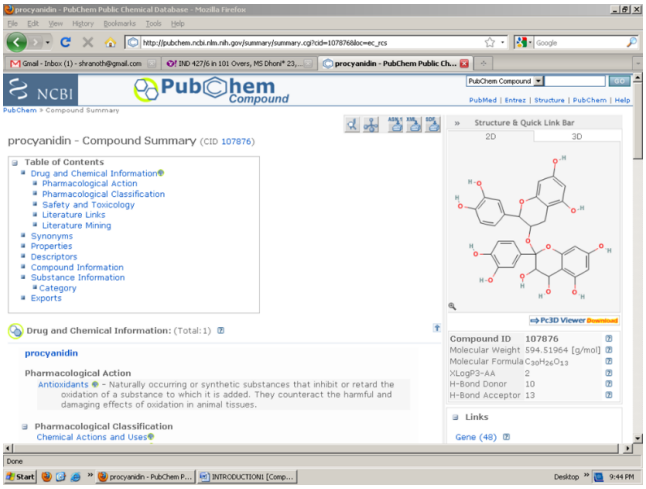

Figure.1. Screenshot of Pub Chem

Protein Data Bank (PDB): We retrived the 3-D structure of the receptor from the PDB.

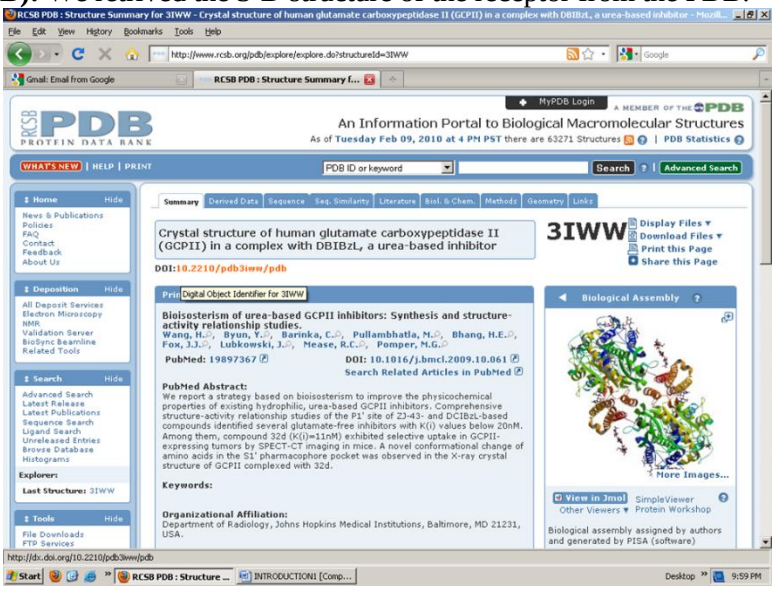

Figure.2. Screenshot of PDB

3. RESULTS

Table.1.Gene responsible for prostate cancer

Sl.no	Genes	GeneID	Organism	pdb id
1	HPC3	**GeneID:** 408259	*Homo sapiens*	3I91
2	PCAP	**GeneID:** 7834	*Homo sapiens*	2A7O
3	HPC4	**GeneID:** 408260	*Homo sapiens*	3EDX
4	MSMB	**GeneID:** 4477	*Homo sapiens*	2IZ3
5	ERG	**GeneID:** 2078	*Homo sapiens*	3DLM
6	PCA3	**GeneID:** 50652	*Homo sapiens*	2E4P
7	PRAC	**GeneID:** 84366	*Homo sapiens*	2RP4
8	SYT7	**GeneID:** 9066	*Homo sapiens*	2D8K
9	KLK3	**GeneID:** 354	*Homo sapiens*	2ANW
10	KLK2	**GeneID:** 3817	*Homo sapiens*	1TON
11	KLK4	**GeneID:** 9622	*Homo sapiens*	2BDG
12	CLU	**GeneID:** 1191	*Homo sapiens*	2PNC
13	FOLH1	**GeneID:** 2346	*Homo sapiens*	3IWW
14	ACPP	**GeneID:** 55	*Homo sapiens*	3GZL

The above mentioned pdb id is found using the pdb data base.

Table.2.List of docking scores

Protein	2ANW	2BDG	2E4P	2PNC	3EDX	3I91	3IWW
Ligands							
2-thioflavopiridol	73.36	79.15	26.47	75	25.63	54.8	92.83
bicalutamide	73.88	67.75	45.24	56.13	38.88	64.61	91.86
Dehydroequo	73.31	73.34	39.6	74.93	19.17	59.43	68.87
3,3'-diindolylmethane	78.78	72.04	37.54	73.15	46.22	57.19	87.33
biochanin A	65.2	77.06	23.19	80.45	24.49	41.86	91.72
edelfosine	nil	nil	nil	nil	nil	nil	Nil
beta-lapachone	89.36	82.69	36.85	81.4	26.82	55.73	94.69
Cilazapril	74.23	77.07	37.25	73.62	16.48	40.26	89.98
everolimus	70.17	85.45	39.34	nil	nil	55.19	Nil
Parthenolide	67.23	86.37	55.15	51.11	19.13	61.06	91.65
phenethyl isothiocyanate	69.82	68.86	20.9	72.39	43.43	59.82	88.18
Gossypol	55.43	85.14	33.71	76.84	47.05	41.14	Nil
resveratrol	65.83	74.04	23.72		26.15	60.83	55.01
Thapsigargin	nil	nil		nil	nil	nil	Nil
limonene	68.95	82.16	35.95	76.24	19.05	61.54	91.18
Simvastatin	67.29	71.75	52.52	79.77	23.79	58.72	63.08
Genistein	47.34	76	51.84	75.56	22.52	56.63	68.05
procyanidin	51.91	89.69	36.88	127.38	21.53	67.85	**98.48**
epigallocatechingallate	nil	nil	nil	nil	nil	nil	Nil
jnk	47.43	79.18	55.46	54.86	15.23	55.24	91.12
silybin	50.45	67.34	13.17		42.14	60.42	91.76
Flutamide	47.93	70.63	34.72	79.43	21.08	51.97	64.98
lycopene	nil	nil	nil	nil	nil	nil	Nil
Suramin	48.3	65.4		77.79	nil	57.17	53.46
safingol	68.77	77.29	58.64	72.35	45.81	63.66	
Phosphatidylinositol4,5 Bisphosphate	nil	nil	nil		nil		Nil
p38	62.4	78.58	34.5		14.86	47.42	87.59
Staurosporine	61.01	72.59			47.62	61.98	93.5
Diamide	58.58	75.82	22.09	72.83	29.4	50.32	94.63
pyrrolidinedithiocarbamic acid	64.6	73.49	50.23	81.63	42.1	62.43	87.75
MEAN	63.92615	76.67923	37.7771	75.26286	29.125	56.2908	83.82696

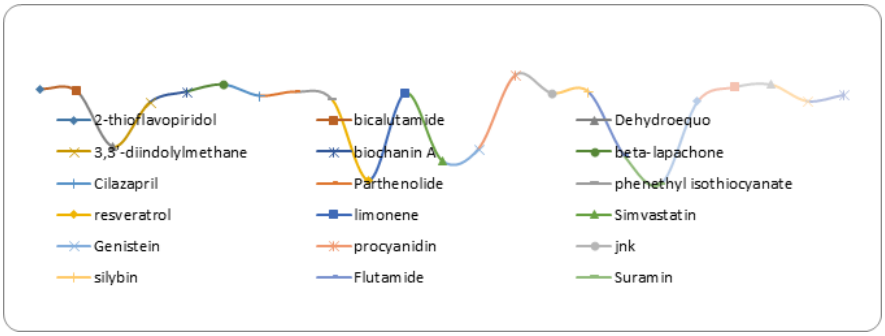

Figure.1. Graph For 3iww Protein

Procyanidin, with the best possible attributes was chosen over the other signal transduction modulators for its capability to act specifically on the FOLH1 (pdb id 3IWW) and gives out satisfactory results.

4. CONCLUSION

From this study indicates that the gene FOLH1 shows maximum target specificity indicating that prostate cancer specific drugs are specific for the particular disease gene and are not random among the networks. The signal transduction modulators are showing good response to the specific type of cancer. The signal transduction modulators were classified based on the RMS value and the best molecules are isolated for further analysis. The procyanidin shows the best docking score of 98.48 kcal when compared to other signal transduction modulators.

Discussion: Cancer is a term used for disease in which abnormal cells divide without control and are able to invade other tissues. Prostate cancer is one of the main type of cancer that develops in the prostate, a gland in the male reproductive system. Genes belonging to the proto-oncogenes and tumor suppressor are best targeted for cancer studies. From the literature study 32 natural signal transduction modulators were collected. Ligands are molecules that can bind with proteins and bring out the required changes. The Ligands with least energy conformers are used, as they are supposed to work in biological field. The protein pivotal for the disease is identified by finding the highest docking score or its peak value. The protein interacts with the ligand and gives out the effect that may well be inhibitory or activatory in function.

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