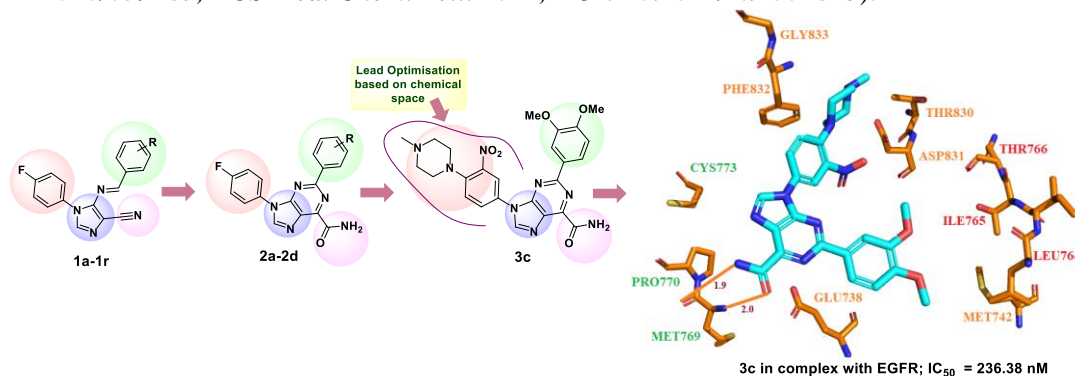


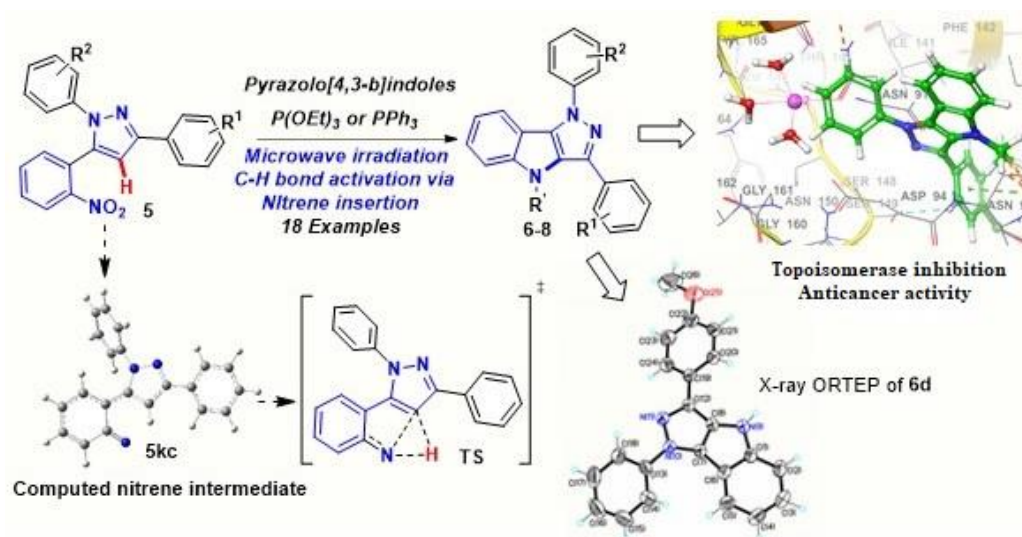
Summary of Research Work

Medicinal Chemistry and Drug Discovery

- New chemical entities as **EGFR inhibitors**, **DNA repair inhibitors**, **Topoisomerase inhibitors** and **mitochondrial death pathway stimulator**, **Xanthine Oxidase inhibitors**, novel 2-substituted benzoxazole derivatives as **COX-2 enzyme inhibitors** and **PDE-4 inhibitors** are developed. **RK-33**, first emerged as **DDX-3 inhibitor** has broad spectrum of anticancer effect (*Organic Letters* 2008, 10, 4681-4684, International Publication Number: WO 2010/039187, *ACS Med. Chem. Lett.* 2011, DOI: 10.1021/ml100281b).



Kumar et al, *RSC Med. Chem.*, 2020, DOI: <https://doi.org/10.1039/D0MD00146E>

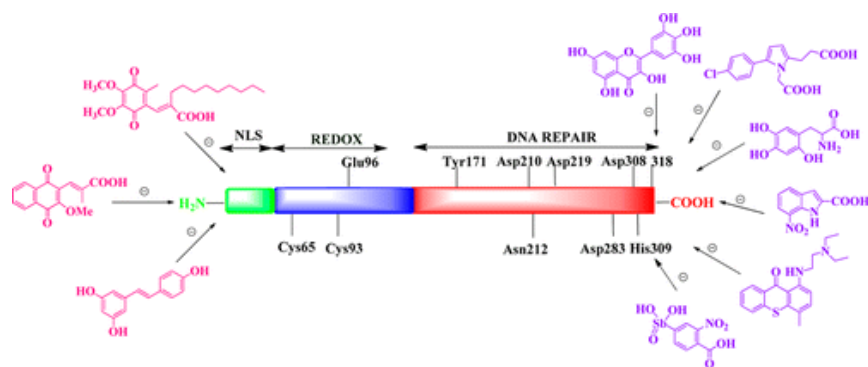


Kumar et al., *Bioorganic Chemistry* 114 (2021) 105114

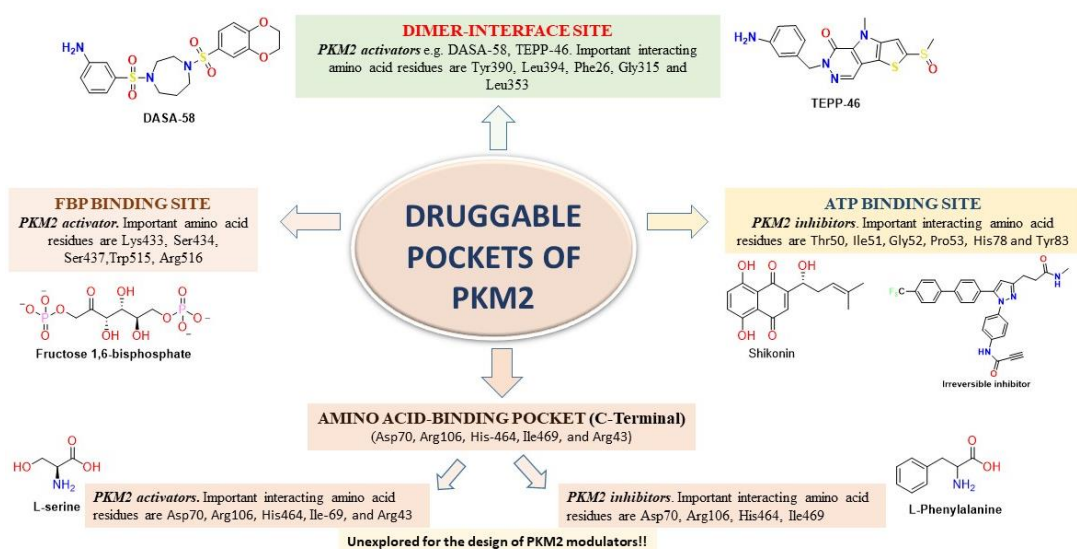


EGFR Inhibitors; *Chem. Commun.*, 2018, 54, 11530-

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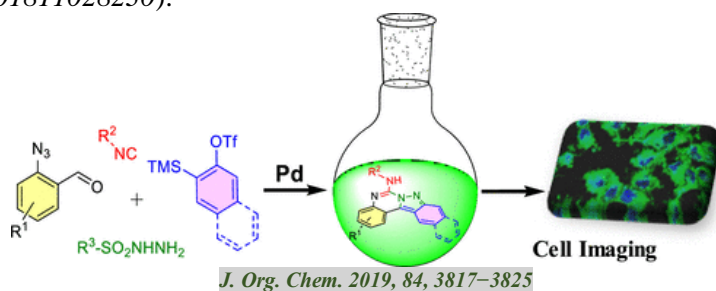
DNA repair Inhibitor; *J. Med. Chem.* 2014, 57, 10241-



Journal of Medicinal Chemistry, 2021, In Press. (IF: 7.45), DOI: 10.1021/acs.jmedchem.1c00981

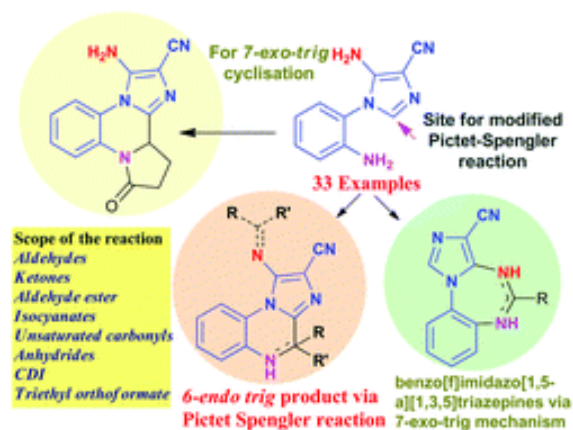
Diagnostic agents

- **Pd-catalyzed cascade reaction** for the synthesis of **fluorescent indazolo[2,3-c]quinazolines** with high quantum yield, and excellent photostability was developed. Its application is explored in **live cell imaging**, which exhibited **cytoplasmic and mitochondrial specific staining** with no toxicity (*J. Org. Chem.* 2019, 84, 3817–3825; Patent No. 201811028230).



Green Chemistry and methodology development

- Recently a “**carbene mediated-Pictet Spengler reaction**” for the first time for the synthesis of imidazo[1,2-a]quinoxaline compounds (*Org. Chem. Front.*, 2018, 5, 3526-3533., *Indian Patent No. 201611014161*) is revealed under **Microwave conditions**. Novel methodologies were established by using **re-usable heterogeneous catalysts** such as HClO_4 adsorbed on SiO_2 , HBF_4 adsorbed on K-10/KSF clays or **Lewis acid catalysts** such as $\text{Cu}(\text{BF}_4)_2 \cdot x\text{H}_2\text{O}$ and $\text{Zn}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}$ with their electrophilic activation potential or **water** or **SDS-water** having dual-activation power. **Microwave-assisted catalyst-free synthesis** of 2-substituted **benzoxazoles** and 4-aminoquinoline derivatives and **pyrazolo(1,5-c)quinazoline** were also developed.



Carbene mediated-Pictet Spengler reaction; *Org. Chem. Front.*, 2018, 5, 3526-3533

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