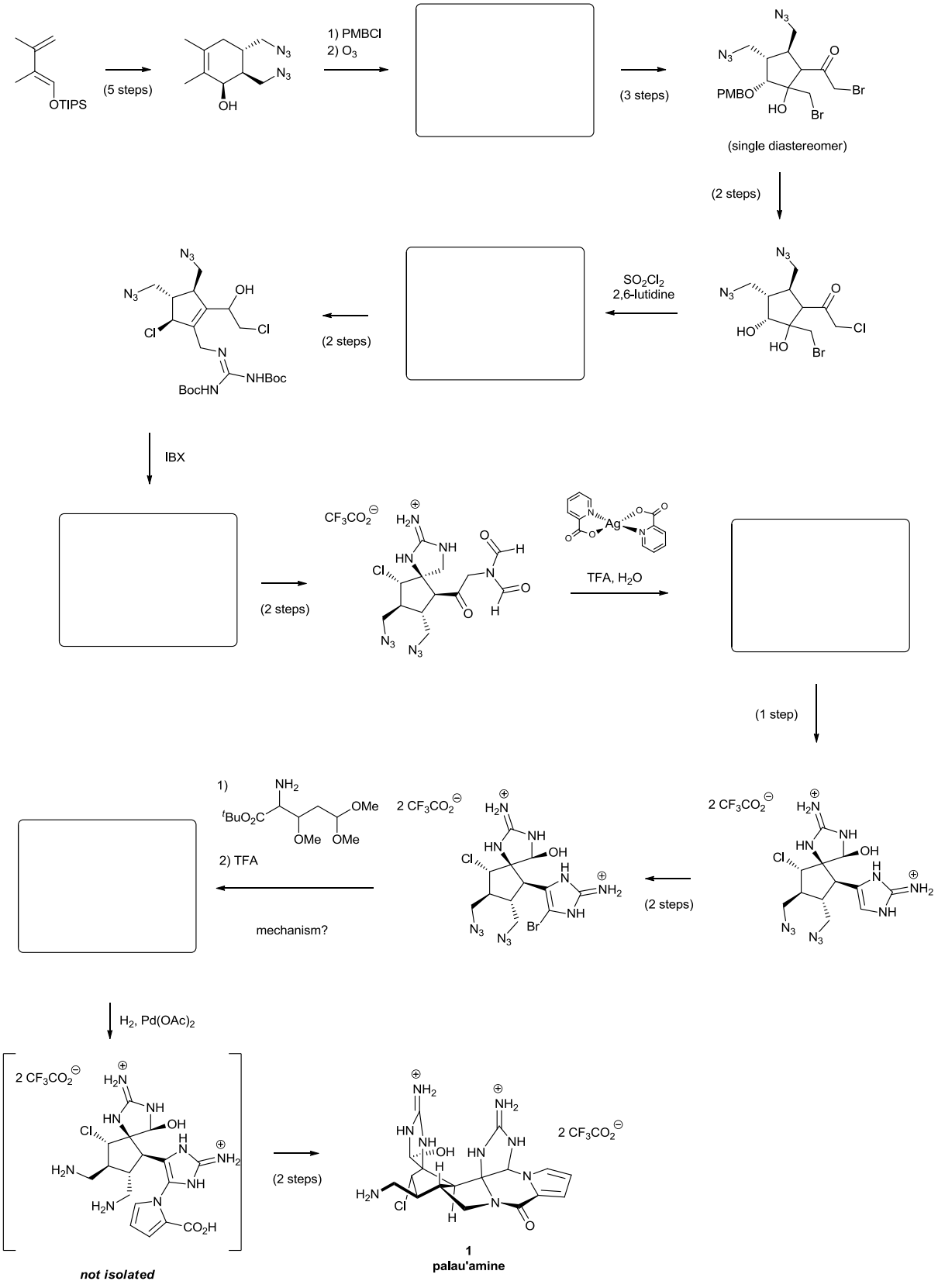
Total Synthesis of Palau'amine

The alkaloid palau'amine (**1**) is a cytotoxic immunosuppressant antibiotic from the sponge *Stylotella agminata*. It possesses challenging structural elements such as 9 nitrogen atoms, 8 stereocenters, reactive aminal and hemiaminal moieties and an oxidation-prone pyrrole. Furthermore, the pyrrole is embedded in a hexacyclic core which contains a highly strained *trans*-azabicyclo[3.3.0.]octane substructure, which is unprecedented among natural products. The total synthesis reported by Phil Baran and co-workers involving 25 steps and an overall yield of 0.015% is given below.

Give reagents and structures where missing and suggest reaction mechanisms.



Total Synthesis of Rippertenol

A recent and concise total synthesis of the termite-derived natural product rippertenol (**2**), which has 7 stereocenters (two of which quarternary), is shown below.

Give reagents and structures where missing and suggest reaction mechanisms.