Preclinical hybrid imaging such as the combination of positron emission tomography (PET) or single-photon emission computed tomography (SPECT) with computed tomography (CT) or magnetic resonance imaging (MRI) has opened new windows onto biology. Preclinical in vivo imaging has evolved from a niche research topic to an established workhorse in biomedical research. It is now commonly used to support drug development, understand the pathophysiology of diseases, and develop new diagnostic and therapeutic methods. Despite the tremendous and widespread role of preclinical imaging in biomedical research, its full potential has not yet been reached.

This lecture will give a short overview of the existing preclinical imaging technique. Examples of preclinical hybrid imaging will be discussed. Then, recommendations on how to improve the translational value of preclinical imaging studies will be provided. Finally, an outlook on future challenges and prospects will be included.

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