While there exist many Monte Carlo (MC) programs for solving the radiative transfer equation (RTE) in biological tissues, we have identified a need for an open-source MC program that is sufficiently user-friendly for use in an education environment, in which detailed knowledge of compiling or UNIX command-line cannot be assumed. Therefore, we introduce MCmatlab, an open-source codebase thus far consisting of (a) a fast 3D Monte Carlo RTE solver and (b) a finite-element heat diffusion and Arrhenius-based thermal tissue damage simulator, both run in MATLAB. The kernel for both of these solvers are written in parallelized C and implemented as MATLAB MEX functions, combining the speed of C with the familiarity and versatility of MATLAB. We present example results generated by the RTE solver and the thermal model. MCmatlab is easy to install and use and can be used by students and experienced researchers alike for simulating tissue light propagation and, optionally, thermal damage.