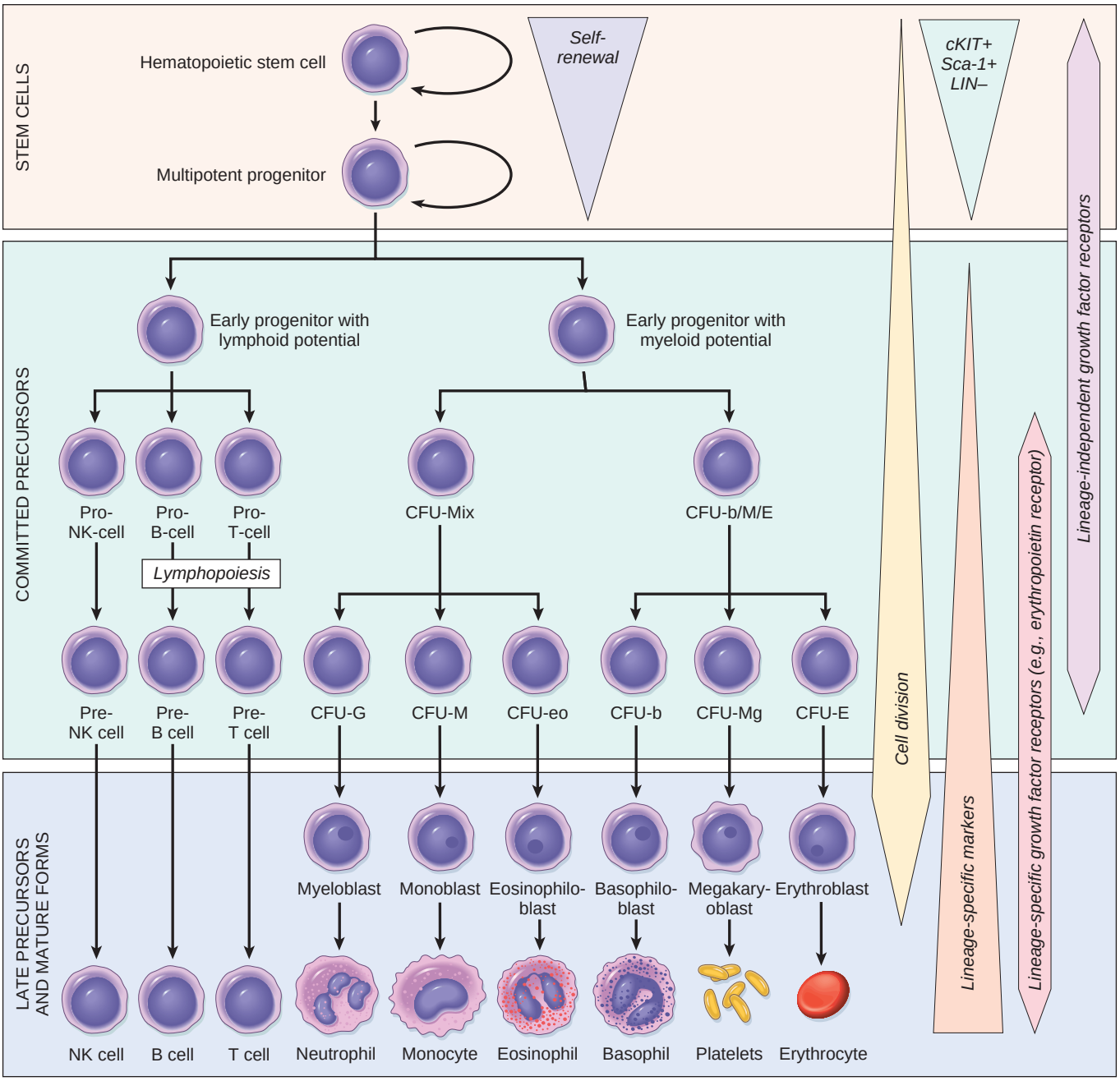

Figure 13-1 Differentiation of blood cells. CFU, Colony forming unit; LIN–, negative for lineage-specific markers.

substantial clinical importance, as HSCs harvested at birth from umbilical cord blood are being used increasingly in therapeutic hematopoietic stem cell transplantation. By the fourth month of development, HSCs shift in location yet again, taking up residence in the bone marrow. By birth, marrow throughout the skeleton is hematopoietically active and hepatic hematopoiesis dwindles to a trickle, persisting only in widely scattered foci that become inactive soon after birth. Until puberty, hematopoietically active marrow is found throughout the skeleton, but soon thereafter it becomes restricted to the axial skeleton. Thus, in normal adults, only about half of the marrow space is hematopoietically active.

The formed elements of blood—red cells, granulocytes, monocytes, platelets, and lymphocytes—have a common origin from HSCs, pluripotent cells that sit at the apex of a hierarchy of bone marrow progenitors (Fig. 13-1). Most evidence supporting this scheme comes from studies in mice, but human hematopoiesis is believed to proceed in a similar way. HSCs give rise to several kinds of early progenitor cells with a restricted differentiation potential, such that they ultimately produce mainly myeloid cells or lymphoid cells. The origins of lymphoid cells are revisited when tumors derived from these cells are discussed. These early progenitors in turn give "birth" to progenitors that are further constrained to differentiation