Chapter 11

Hodgkin’s Disease

Andrea Staratschek-Jox, Jürgen Wolf and Volker Diehl
Department of Internal Medicine I, HS16, University of Cologne, D-50924 Cologne, Germany. Tel: +49-221-478-4400; Fax: +49-221-478-5455

1. INTRODUCTION

The microscopic appearance of Hodgkin’s disease (HD) tissue is a small number of lymphoma cells, the so-called Hodgkin and Reed-Sternberg (H-RS) cells, surrounded by a non-neoplastic cellular environment consisting mostly of T-lymphocytes [47].

The first cell line (L428) was derived from a pleural effusion obtained from a 37-year-old woman with relapse of nodular sclerosing Hodgkin’s disease [52]. The L428 cell line was considered to be of H-RS cell origin for the following reasons: the clonal cell population expressed the H-RS cell-associated clusters of differentiation CD 15 and CD30, cytogenetic analysis revealed a grossly aberrant karyotype, the cell line did not harbor EBV and tumor development was observed in nude mice after intracranial inoculation. These four criteria are used to judge whether the continuous cell line was established from the HD cells. The establishment of such lines is a rare event and only 17 cell lines have been described. One of these, known as Co or Cole, is cross-contaminated and is in fact the T-ALL derived cell line CCRF-CEM [15].

A cell line that grows out from a culture of HD affected tissue or effusion does not, as a rule, represent an H-RS cell population, since other cells present can give rise to a continuous cell line. For only one cell line, L1236 [69] was derivation from H-RS cells unequivocally demonstrated by amplification of identical Ig gene rearrangements from the cell line and from single H-RS cells microdissected from a section of a bone marrow biopsy from the patient [31]. For all of the other cell lines, there is no such authentication.

From one cell line (SBH-1), the histology of the lymphoma tissue was not available [6], and thus there is no proof that the patient suffered from HD. Another cell line, (HKB-1), was derived from a recurrence of HD in a patient who initially presented with a large cell anaplastic lymphoma at the same
site [66]. Consequently, the cell line may have been derived from the ALCL, rather than the HD.

The clinical characterization, immunophenotype, cytokine expression, chromosomal aberrations and growth characteristics of the 16 cell lines which may represent HD cells are summarized in Tables 1–5 and discussed below.

2. CLINICAL CHARACTERIZATION

Two further cell lines (L591, L540) were established from HD by the same group that developed L428 [8]. The three lines were derived from pleural effusions or bone marrow aspirate obtained from young women with progressive HD of nodular sclerosis subtype. A further 13 HD derived cell lines have been reported, 11 of which were derived from young patients suffering from nodular sclerosis HD, and in the other 2 cases, the line was derived from HD of mixed cellularity. This reflects the incidence of the histological HD subtypes among young adults, with most having nodular sclerosis HD [2]. Like the first three cell lines, most of the subsequent lines grew from HD-affected material obtained from pretreated patients during relapse or progressive disease. Eleven cell lines were established from either pleural effusion, pericardial effusion or peripheral blood (see Table 1).

3. IMMUNOPHENOTYPE

The vast majority of H-RS cells and the HD cell lines express CD30. This antigen is also expressed on activated or transformed (with human T-lymphotrophic virus-1 or Epstein–Barr virus) T and B lymphocytes [55], activated [45] and differentiated macrophages [1], and on the tumor cells of anaplastic large cell lymphoma (ALCL), which can also be called Ki-1-lymphoma [43]. This reaction pattern makes CD30 antibodies a valuable diagnostic tool. The CD30 antigen is a 120 kDa, membrane-bound, phosphorylated glycoprotein with a non-phosphorylated, 84 kDa, intracellular apoprotein and a 90 kDa degradation residue released into the supernatant [21]. Additionally, an independently synthesized 57 kDa intracellular molecule has the same antigenicity. The gene coding for CD30 has been cloned and identified as a member of the TNF-receptor superfamily [16]. The CD30 ligand has also been cloned [57]. The interaction of CD30 with its ligand is thought to be involved in the regulation of apoptosis and proliferation of activated lymphatic cells.