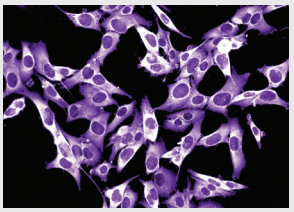
■ Article

Nivolumab: Immunotherapy in Malignant Melanoma

Heather Bayless, MSN, RN, OCN®, CHPN, and Susan Schneider, PhD, RN, AOCN®, FAAN



© Dlumen/iStock/Thinkstock

Background: Although patients diagnosed with melanoma that is confined to the skin have a five-year survival rate of 98%, this number drops to 16% with widely metastatic disease. Melanoma rates have been steadily increasing since the 1970s, but cytotoxic chemotherapy generally prolongs survival by about four months. Nivolumab is an effective immunotherapy agent.

Objectives: This article discusses the use of nivolumab for metastatic melanoma.

Methods: Clinical trial and early postmarketing data were reviewed.

Findings: In clinical trials, patients with advanced melanoma experienced partial sustained responses to nivolumab, a new targeted immunotherapy agent, for more than one year. Nivolumab helps the immune system mobilize lymphocytes that have been inactivated by melanoma cells, enhancing the body's ability to recognize the cancer as abnormal. Compared to conventional chemotherapy, nivolumab has been shown to greatly improve survival in widespread, inoperable malignant melanoma. Oncology nurses will administer, monitor, and educate patients about nivolumab.

Heather Bayless, MSN, RN, OCN®, CHPN, is a doctor of nursing practice student in the School of Nursing at Duke University in Durham, NC, and adjunct nursing faculty at Breckinridge School of Nursing at ITT Technical Institute in Salem, VA; and Susan Schneider, PhD, RN, AOCN®, FAAN, is an associate professor in the School of Nursing at Duke University. The authors take full responsibility for the content of the article. The authors did not receive honoraria for this work. The content of this article has been reviewed by independent peer reviewers to ensure that it is balanced, objective, and free from commercial bias. No financial relationships relevant to the content of this article have been disclosed by the authors, planners, independent peer reviewers, or editorial staff. Bayless can be reached at heather.bayless@duke.edu, with copy to editor at CJONEditor@ons.org. (Submitted April 2014. Revision submitted October 2014. Accepted for publication November 16, 2014.)

Key words: antibodies, monoclonal; anti-programmed cell death protein 1, human; melanoma; molecular targeted therapy; nivolumab; programmed cell death protein 1 receptor

Digital Object Identifier: 10.1188/15.CJON.430-432

Research focusing on cancer cells' ability to evade detection by the immune system has shown that many cancers can disable the cytotoxic T lymphocytes that normally recognize and kill cancerous cells. For T cells to recognize cancer cells as abnormal, two processes must take place. First, an antigen-presenting cell expresses specific proteins (antigens) from the cancer cell, which are recognized by T-cell receptors. Second, interactions between the T cell and the antigen-presenting cell determine whether the T cell is activated to target and kill cells expressing the specific antigens. This second step serves as a checkpoint in the immune activation process and normally helps prevent overreaction of the immune system. However, if T cells have been repeatedly activated over time, they can become exhausted. At this point, the inhibitory receptor programmed cell death protein 1 (PD-1) is induced on the T cells, and they become dormant (Sullivan, Lorusso, and Flaherty, 2013).

Melanoma cells have been found to express the ligands of PD-1 (programmed death-ligand 1 or 2 [PDL-1 or PDL-2]), which prevent T lymphocytes from binding to them. In this manner, they are able to evade immune detection and destruction. Monoclonal anti-PD-1 antibodies are being designed to block this interaction, allowing T cells to recognize tumor cells as abnormal and destroy them. One such drug, nivolumab, shows promise for the treatment of several cancers, including metastatic melanoma.

Nivolumab was approved for unresectable metastatic melanoma in December 2014 and for non-small cell lung cancer in March 2015 (Bristol-Myers Squibb, 2015). Another approved drug, ipilimumab, is being tested for use in combination with nivolumab to increase effectiveness (McDermott & Atkins, 2013). The ligands to which PD-1 binds are often increased on many tumor types, including ovarian, esophageal, breast, cervical, and pancreatic cancers (Merelli, Massi, Cattaneo, & Mandalà, 2014), giving a wide range of potential indications for nivolumab.

Physiologic Action

Immune cells were first observed infiltrating tumors in the 1970s, providing scientists with a partial understanding of the mechanisms of cancer latency and regression (Sullivan et al.,