



US009914974B2

(12) **United States Patent**
Bajic et al.

(10) **Patent No.:** **US 9,914,974 B2**
(45) **Date of Patent:** ***Mar. 13, 2018**

(54) **MOLECULAR BIOMARKER SET FOR
EARLY DETECTION OF OVARIAN CANCER**

(71) Applicant: **King Abdullah University of Science
and Technology, Thuwal (SA)**

(72) Inventors: **Vladimir Bajic, Thuwal (SA);
Mandeep Kaur, Thuwal (SA)**

(73) Assignee: **King Abdullah University of Science
and Technology, Thuwal (SA)**

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

This patent is subject to a terminal dis-
claimer.

(21) Appl. No.: **14/734,190**

(22) Filed: **Jun. 9, 2015**

(65) **Prior Publication Data**

US 2015/0284809 A1 Oct. 8, 2015

Related U.S. Application Data

(63) Continuation of application No. 13/415,004, filed on
Mar. 8, 2012, now Pat. No. 9,057,107.

(60) Provisional application No. 61/450,212, filed on Mar.
8, 2011.

(51) **Int. Cl.**

C12Q 1/68 (2018.01)
G01N 33/487 (2006.01)
G01N 33/50 (2006.01)
G01N 33/574 (2006.01)

(52) **U.S. Cl.**

CPC **C12Q 1/6886** (2013.01); **G01N 33/57449**
(2013.01); **C12Q 2600/118** (2013.01); **C12Q**
2600/158 (2013.01); **G01N 2333/47** (2013.01);
G01N 2800/50 (2013.01); **Y10T 436/143333**
(2015.01)

(58) **Field of Classification Search**

None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,817,837 A 6/1974 Rubenstein et al. 435/7.9
3,850,752 A 11/1974 Schuurs et al. 435/7.93
3,939,950 A 2/1976 Nishida et al. 192/225
3,996,345 A 12/1976 Ullman et al. 436/537
4,275,149 A 6/1981 Litman et al. 435/7.91
4,277,437 A 7/1981 Maggio 422/401
4,366,241 A 12/1982 Tom et al. 435/7.91
4,683,195 A 7/1987 Mullis et al. 435/6.11
4,683,202 A 7/1987 Mullis 435/91.2
4,800,159 A 1/1989 Mullis et al. 435/91.2
4,883,750 A 11/1989 Whiteley et al. 435/6.16
4,946,773 A 8/1990 Maniatis et al. 435/6.11
5,279,721 A 1/1994 Schmid 204/457
5,840,873 A 11/1998 Nelson et al. 536/24.3
5,843,640 A 12/1998 Patterson et al. 435/5

5,843,650 A 12/1998 Segev 435/6.1
5,843,651 A 12/1998 Stimpson et al. 435/6.11
5,843,663 A 12/1998 Stanley et al. 435/6.11
5,846,708 A 12/1998 Hollis et al. 23/92
5,846,709 A 12/1998 Segev 435/6.1
5,846,717 A 12/1998 Brow et al. 435/6.18
5,846,726 A 12/1998 Nadeau et al. 435/6.12
5,846,729 A 12/1998 Wu et al. 435/6.12
5,846,783 A 12/1998 Wu et al. 435/91.2
5,849,481 A 12/1998 Urdea et al. 435/6.11
5,849,483 A 12/1998 Shuber 435/5
5,849,486 A 12/1998 Heller et al. 435/6.11
5,849,487 A 12/1998 Hase et al. 435/6.12
5,849,497 A 12/1998 Steinman 435/6.11
5,849,546 A 12/1998 Sousa et al. 435/91.5
5,849,547 A 12/1998 Cleuziat et al. 435/91.21
5,851,770 A 12/1998 Babon et al. 435/6.14
5,851,772 A 12/1998 Mirzabekov et al. 435/6.14
5,853,990 A 12/1998 Winger et al. 435/6.18
5,853,992 A 12/1998 Glazer et al. 435/6.12
5,853,993 A 12/1998 Dellinger et al. 435/6.14
5,856,092 A 1/1999 Dale et al. 435/6.11
5,858,652 A 1/1999 Laffler et al. 435/5
5,861,244 A 1/1999 Wang et al. 435/6.14
5,863,732 A 1/1999 Richards 435/6.1
5,863,753 A 1/1999 Haugland et al. 435/34
5,866,331 A 2/1999 Singer et al. 435/6.11
5,866,337 A 2/1999 Schon 435/6.18
5,866,366 A 2/1999 Kallender 435/69.1

(Continued)

FOREIGN PATENT DOCUMENTS

EP 329 822 2/1988
EP 320 308 6/1989

(Continued)

OTHER PUBLICATIONS

Bioinformatics (Bioinformatics 2006).*
Adib TR, Henderson S, Perrett C, Hewitt D, Bourmpoulia D,
Ledermann J, Boshoff C., "Predicting biomarkers for ovarian cancer
using gene-expression microarrays", Br J Cancer 2004, 90:686-692.
Anttila et al., "Expression of transcription factor AP-2 α predicts
survival in epithelial ovarian cancer", British Journal of Cancer
(2000), vol. 82, No. 12, pp. 1974-1983.
Arocho Alaina, Ladanyi Marc, Pan Qiulu. "Validation of the
2[DELTA][DELTA]Ct Calculation as an Alternate Method of Data
Analysis for Quantitative PCR of BCR-ABL P210 Transcripts".
Diagnostic Molecular Pathology: Mar. 2006, vol. 15, Issue 1, pp.
56-61.

(Continued)

Primary Examiner — Julie Wu

(74) Attorney, Agent, or Firm — Smith, Gambrell &
Russell

(57) **ABSTRACT**

Embodiments of the present invention concern methods and
compositions related to detection of ovarian cancer, includ-
ing detection of the stage of ovarian cancer, in some cases.
In particular, the invention encompasses use of expression of
TFAP2A and in some embodiments CA125 and/or E2F5 to
identify ovarian cancer, including detecting mRNA and/or
protein levels of the respective gene products. Kits for
detection of ovarian cancer are also described.

13 Claims, 5 Drawing Sheets