

Find targets that are associated with new biomarkers

Could emerging disease biomarkers represent novel drug targets?

Biomarker Module of Clarivate Analytics Integrity enables you to find recently added biomarkers associated with your disease of interest and quickly verify whether they are known drug targets. **Example Scenario:** you want to see up-to-date information related to biomarkers associated with Crohn's Disease and investigate which, if any, are established drug targets.

Find recently added biomarkers related to a specific disease:

The screenshot shows the Biomarker search interface. On the left is a sidebar with 'Knowledge Areas' including Drugs & Biologics, Targets & Pathways, Genomics, Biomarkers (selected), Organic Synthesis, Experimental Pharmacology, Experimental Models, Pharmacokinetics/Metabolism, Clinical Studies, Disease Briefings, Companies & Research Institutions, Literature, and Patents. The main area has tabs for Advanced Search, Session History, Clear Form, and Start. In the Biomarker section, 'Condition' is selected. A dropdown menu shows 'Condition' expanded to 'Safety/Tox' and 'Experimental Pathology'. Below the search form, there is a 'Lookup' field containing 'crohn' and a 'Lookup' button. A tip box says: 'Click the plus sign next to a term to display subclasses and make your selection. Alternatively, enter a word or part of a word in the box below and click Lookup. Then use the scroll bar in combination with the First, Previous, Next and Last buttons to locate terms within the hierarchy.' Another tip box says: 'Click the button below to change between Hierarchical and Alphabetical lists.' It also includes an 'Order Alphabetically' button. To the right, a list of diseases under 'Crohn's disease' is shown, including Ulcerative colitis, Intestinal atrophy, Intestinal obstruction, Intestinal polyps, Irritable bowel syndrome, Small intestine disorders, Spasm, intestinal, Volvulus, Pancreatic disorders, Peptic ulcer disease and related disorders, Peritoneal diseases, Salivary gland dysfunction, Stenosis, pyloric, Synchronous diaphragmatic flutter (Hiccup), Genetic Disorders, Genitourinary Disorders, Hematologic Diseases, Immunological Disorders, Infections, and Metabolic Diseases.

To find recently added biomarkers related to a specific disease, go to the **Biomarkers** knowledge area.

Click **Select Value** in the Biomarker section and choose **Indication -> Condition** from the dropdown menu.

Click **Index** to the right of this field.

In the pop up window that appears, type “**crohn**” into the text box on the left side of the window and click **Lookup**. Select **Crohn's disease** in red on the right-hand side of the window.

Tip:

- You can click **Order Alphabetically** once you've searched for the term in an index to see all the results as an alphabetic list. You can then select multiple items on this list to be used as search terms.

Next, click **Optional Value** in the **Biomarker** section and choose **Available Since** from the dropdown menu.

Click **Index** to the right of this field to see the date format used in *Integrity*. In the search form, type “from 20170101” to retrieve biomarker records added to the database since January 1st, 2017.

Now with both fields entered, click the **Start** button at the top of the page to begin the search.

Tip: Integrity includes multi-markers, such as gene signatures or protein panels, where a combination of components is used as biomarker. You can exclude multi-markers from your search results by selecting **Combination Biomarker (Y/N)** from the menu of optional values and typing “n” (for “No”) into the search form.

Working with your data:

Biomarkers Search Results

Query > Condition (Indication) = "Crohn's disease" AND Available Since = from 20170101

Marker Name	Type	Use Indication Type	Options	Source
Anti-proline-rich protein 13 antibodies	Proteomic	Major Condition	<input type="button" value="Biomarker List"/>	EME EXP ESH LSH RIA All Ref Pat Kits
Anti-transcription elongation factor A protein-like 1 antibodies	Proteomic	Gastrointestinal Disease	<input type="button" value="Biomarker Full Record"/>	2 2 1
Anti-transcription elongation factor A protein-like 1 antibodies	Proteomic	All	<input type="button" value="Biomarker Use Record"/>	2 2 1
Chromosome locus 12p21	Genomic	Major Condition	<input type="button" value="Biomarker List with Kits"/>	2 2 1
Chromosome locus 12p21	Genomic	Gastrointestinal Disease	<input type="button" value="Kit Development Status List"/>	2 2 1
Chromosome locus 12p21	Genomic	All	<input type="button" value="All Related Information via Quick Search"/>	2 2 1
Laminin subunit beta 2 pseudogene 1	Genomic	Major Condition	<input type="button" value="Printer Friendly Format"/>	EME EXP ESH LSH RIA All Ref Pat Kits
Laminin subunit beta 2 pseudogene 1	Genomic	Gastrointestinal Disorders		1 1 1
Laminin subunit beta 2 pseudogene 1	Genomic	All		1 1 1
Long intergenic non-protein coding RNA 1430	Genomic	Major Condition		EME EXP ESH LSH RIA All Ref Pat Kits
Long intergenic non-protein coding RNA 1430	Genomic	Gastrointestinal Disorders		1 1 1
Long intergenic non-protein coding RNA 1430	Genomic	All		1 1 1

Biomarkers search results are presented in a summary **Biomarker Table** showing the number of uses at each **Validity** phase, grouped by **Major Condition**. To see more details, click on the **Options** menu and select **Biomarker List**.

The **Biomarker List** view shows more details about each biomarker use, including the breakdown of source references and patents. References can be supporting, conflicting or equivocal, depending on the evidence they contain.

Biomarkers Search Results

Query > Condition (Indication) = "Crohn's disease" AND Available Since = from 20170101

Marker Name	Population Role	Technique (Substrate)	Parameter	Validity (Authority)	Sources	+/-	All	View Use
Anti-proline-rich protein 13 antibodies	All Diagnosis	FIA / Flow cytometry (Serum)	NA	Early Studies in Humans	Ref	0	0	View Use
Anti-proline-rich protein 13 antibodies	All Differential Diagnosis	FIA / Flow cytometry (Serum)	NA	Early Studies in Humans	Ref	0	0	View Use
Anti-transcription elongation factor A protein-like 1 antibodies	All Diagnosis	FIA / Flow cytometry (Serum)	NA	Early Studies in Humans	Ref	0	0	View Use
Anti-transcription elongation factor A protein-like 1 antibodies	All Differential Diagnosis	FIA / Flow cytometry (Serum)	NA	Early Studies in Humans	Ref	0	0	View Use

Tip:

- You can find full definitions for **validity** phases, **source evidence** and other fields in the **Biomarker Frequently Asked Questions (FAQs)** document. There is a link to the FAQs from the **Learning Center** panel, located on the bottom left corner of the *Integrity* homepage or from the Biomarkers Advanced Search page by clicking the link in the left-hand column.

Source Evidence

Condition (Indication) = "Crohn's disease" AND Available Since = from 20170101

Display Options

- Horizontal Display
- Vertical Display
- Pie Chart Display

View Subsets

Print Chart

Help

at least 1 + source + sources only - sources only at least 1 - source
+ Check All 0 2 4 6 8 10 12 14 16 18 20

Filter by **Source Evidence** and click on the bar for “at least 1 + source” to include only those results where a significant association ($p<0.05$) has been found between biomarker and condition in at least one published reference.

Verifying which biomarkers are known drug targets:

Biomarkers Search Results

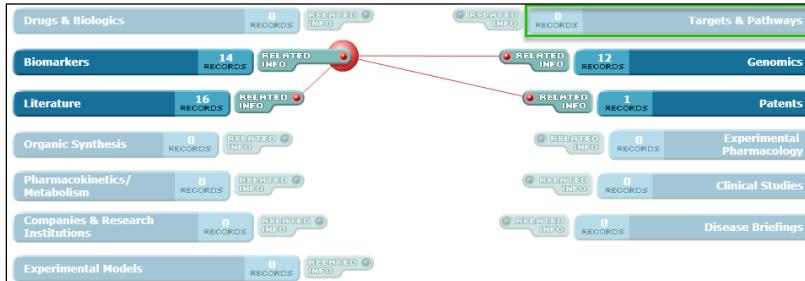
Query > Condition (Indication) = "Crohn's disease" AND Available Since = from 20170101

Marker Name	Population Role	Technique (Substrate)	Parameter	Validity (Authority)	Sources	+/-	All	View Use
Anti-transcription elongation factor A protein-like 1 antibodies	All Diagnosis	FIA / Flow cytometry (Serum)	NA	Early Studies in Humans	Ref	1	0	View Use
Chromosome locus 12p21	All Risk Factor	Genotyping (DNA)	NA	Early Studies in Humans	Ref	1	0	View Use
Laminin subunit beta 2 pseudogene 1	All Risk Factor	Genotyping (DNA)	NA	Early Studies in Humans	Ref	1	0	View Use

To review further information associated with these biomarkers, you can open the **Options** pull down menu and click **All Related Information via Quick Search**. The display will then allow you to view the information related to your Biomarkers results in the other Knowledge Areas of *Integrity*.

If any of the biomarkers is a known drug target the display will show related **Targets&Pathways** records which can be explored to find details of related drugs, the conditions (diseases or disorders) those drugs are intended to treat, their developmental status, which organizations are involved, etc.

If you have any questions please contact us at: DTStraining@clarivate.com



In this example, there are no related **Targets&Pathways** records, suggesting that the new biomarkers present potential white space for further investigation.

To be notified of any new biomarkers that match your search query, open **Options** pulldown menu and click **Save Query**. Fill in the pop up box to choose the frequency of e-mail updates.

Tip:

- Using **All Related Information via Quick Search** from the **Biomarker Table** or **Biomarker List** display will retrieve all information related to the full biomarker records, including all their uses.

To retrieve only the information related to a specific subset of biomarker uses, open the **Options** pull-down menu and click **Biomarker Use Record** to change the display. Now when you click on **All Related Information via Quick Search** from the **Biomarker Use Record** display, the results will be directly relevant to only those **Biomarker Use Record**, for example:

- **Literature**: generate a highly relevant reading list which can be exported to reference management software.

- **Patents**: see which organizations are patenting a biomarker use, potentially as a future Companion Diagnostic.

- **Drugs & Biologics**: explore drugs used in biomarker studies to see their mechanism of action, development status, which organizations are involved etc.

- **Clinical Studies**: read specially written summaries of the outcomes of drug trials.

